

BS in Biochemistry (692826) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry

For students entering the degree program during the 2021-2022 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses	
University Core Requirements:				FRESHMAN YEAR	JUNIOR YEAR
Requirements	#Classes	Hours	Classes	1st Semester	5th Semester
Religion Cornerstones				Biological Science - BIO 130 or CELL 120	CHEM 391 (FW)
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	CHEM 111* (F)	CHEM 482 (F)
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	First-year Writing or A HTG 100	CHEM 584 (F)
Foundations of the Restoration	1	2.0	REL C 225	MATH 112 (WSpSu)	PHSCS 220 (FWSu)
The Eternal Family	1	2.0	REL C 200	Religion Cornerstone course	CHEM 497R or open elective
The Individual and Society				Total Hours	Civilization 1 or Social Science
American Heritage	1-2	3-6.0	from approved list	16.0-17.0	Total Hours
Global and Cultural Awareness	1	3.0	from approved list	*With department approval, CHEM 105 may be substituted for CHEM 111.	16.0
Skills				2nd Semester	6th Semester
First Year Writing	1	3.0	from approved list	First-year Writing or A HTG 100	CHEM 586 (W)
Advanced Written and Oral Communications	1	3.0	CHEM 391*	CHEM 112* (W)	CHEM 468 (W)
Quantitative Reasoning	1	4.0	MATH 112* or 113*	CHEM 113* (FW)	PWS 340 (FW)
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	CHEM 201 (FW)	CHEM 497R or open elective
Arts, Letters, and Sciences				MATH 113 (FWSpSu)	PD BIO 360 (FWSp) or other Requirement 3
Civilization 1	1	3.0	from approved list	Religion Cornerstone course	Religion Elective
Civilization 2	1	3.0	from approved list	Total Hours	15.0
Arts	1	3.0	from approved list	* With department approval, CHEM 106 may be substituted for CHEM 112; CHEM 107 for CHEM 113.	SENIOR YEAR
Letters	1	3.0	from approved list	SOPHOMORE YEAR	7th Semester
Biological Science	1	4.0/3.0	BIO 130* or CELL 120*	3rd Semester	CHEM 489 (F)
Physical Science	2	7.0	CHEM 111* and PHSCS 121*	CHEM 227 (FSp)	CHEM 594R (FW)
Social Science	1	3.0	from approved list	STAT 201* or MATH 213 & 215 (FW)	Requirement 4 or open elective
Core Enrichment: Electives				PHSCS 121 (FWSpSu)	Civilization1, 2 or Social Science
Religion Electives	3-4	6.0	from approved list	CHEM 351M** (F)	Global and Cultural Awareness
Open Electives	Variable	Variable	personal choice	Religion Cornerstone course	Religion Elective
				Total Hours	14.5
				*MATH 213 & MATH 215 may be substituted for STAT 201 **CHEM 351 may be substituted for CHEM 351M	8th Semester
				4th Semester	CHEM 495 (FW)
				CHEM 352M* (W)	CHEM 498R or other Requirement 4
				CHEM 354* (FWSp)	Civilization 2 or Social Science
				CHEM 381M** (W)	Arts
				CHEM 384 (W)	Letters
				PHSCS 123 (FWSp)	Religion elective
				CHEM 497R or open electives	Total Hours
				Religion Cornerstone course	15.0
				Total Hours	
				14.0	
				*CHEM 352 may be substituted for CHEM 352M; CHEM 353 may be substituted for CHEM 354 **With department approval, CHEM 481 may substitute for CHEM 381M	
Graduation Requirements:					
Minimum residence hours required		30.0			
Minimum hours needed to graduate		120.0			
				Note: CHEM 498R is a research capstone class. Typically, enrollment in CHEM 498R follows enrollment in CHEM 497R. Both courses give students an opportunity to be mentored in a faculty's research lab and receive class credit. Permission from faculty to enroll in either course is required. Contact department office for specific details.	

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2021-2022 Program Requirements (77 Credit Hours)

No more than 3 hours of D credit is allowed in major courses.		MMBIO 465 - Virology	3.0
REQUIREMENT 1 Complete 18 courses		MMBIO 468 - (MMBio-Bio-PWS) Genomics	3.0
NOTE: WITH DEPARTMENT APPROVAL CHEM 105 MAY SUBSTITUTE FOR CHEM 111; AND CHEM 106 FOR CHEM 112; AND CHEM 107 FOR CHEM 113.		REQUIREMENT 5 Complete 7.0 hours from the following course(s)	
NOTE: ONLY 1 CREDIT HOUR OF CHEM 354 IS REQUIRED; COMPLETION OF 2 CREDIT HOURS WILL SATISFY THE REQUIREMENT FOR CHEM 354 AND 1 CREDIT HOUR OF ELECTIVES UNDER REQUIREMENT 4.		AFTER CONSULTING WITH AN ADVISOR, COMPLETE 7 HOURS FROM THE FOLLOWING. NOTE: ONLY ONE OF BIO 130 OR CELL 120 CAN BE APPLIED TO THIS REQUIREMENT. NOTE: CHEM 355 CANNOT BE TAKEN IF CHEM 354 WAS TAKEN FOR 2 CREDIT HOURS. NOTE: WITH PRIOR APPROVAL, MANY 300-LEVEL AND ABOVE COURSES IN BIOLOGY, INTEGRATIVE BIOLOGY, MICROBIOLOGY AND MOLECULAR BIOLOGY, AND PHYSIOLOGY AND DEVELOPMENTAL BIOLOGY WILL FILL THIS REQUIREMENT.	
CHEM 111 - Principles of Chemistry 1	4.0	BIO 130 - Biology	4.0
CHEM 112 - Principles of Chemistry 2	3.0	CELL 120 - Science of Biology	3.0
CHEM 113 - Introductory General Chemistry Laboratory	2.0	CHEM 355 - Organic Chemistry Laboratory 2 - Nonmajors	1.0
CHEM 201 - Chemical Handling and Safe Laboratory Practices	0.5	CHEM 397R - Mentored Outreach and Service Learning	3.0v
CHEM 227 - Principles of Chemical Analysis	4.0	CHEM 455 - Synthesis and Qualitative Organic Analysis	4.0
CHEM 351M - Organic Chemistry 1 - Majors	3.0	CHEM 460 - Mathematics for Physical Chemistry	1.0
CHEM 352M - Organic Chemistry 2 - Majors	3.0	CHEM 496R - Academic Internship: Chemistry and Biochemistry	6.0v
CHEM 354 - Organic Chemistry Laboratory--Majors	2.0v	<i>You may take up to 3 credit hours.</i>	
CHEM 381M - Fundamentals of Biochemistry	3.0	CHEM 498R - Capstone Experience in Chemistry/Biochemistry	4.0v
CHEM 384 - Biochemistry Methods	1.0	<i>You may take up to 3 credit hours.</i>	
*CHEM 391 - Technical Writing Using Chemical Literature	3.0	CHEM 514 - Inorganic Chemistry	3.0
CHEM 468 - Biophysical Chemistry	3.0	CHEM 518 - Advanced Inorganic Laboratory	2.0
CHEM 482 - Mechanisms of Molecular Biology	3.0	CHEM 521 - Instrumental Analysis Lecture	2.0
CHEM 489 - Structural Biochemistry	3.0	CHEM 523 - Instrumental Analysis Laboratory	2.0
CHEM 495 - Senior Seminar	1.0	CHEM 552 - Advanced Organic Chemistry	3.0
CHEM 584 - Advanced Biochemistry Methods 1	3.0	CHEM 553 - Advanced Organic Chemistry	3.0
CHEM 586 - Advanced Biochemistry Methods 2	3.0	CHEM 563 - Reaction Kinetics	3.0
CHEM 594R - General Seminar	0.5	CHEM 565 - Introduction to Quantum Chemistry	3.0
REQUIREMENT 2 Complete 6 courses		CHEM 567 - Statistical Mechanics	3.0
MATH 112 - Calculus 1	4.0	CHEM 569 - Fundamentals of Spectroscopy	3.0
MATH 113 - Calculus 2	4.0	CHEM 581 - Advanced Biochemical Methodology 1	3.0
PHSCS 121 - Introduction to Newtonian Mechanics	3.0	CHEM 583 - Advanced Biochemical Methodology 2	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0	CHEM 596R - Special Topics in Chemistry	3.0v
PHSCS 220 - Introduction to Electricity and Magnetism	3.0	<i>You may take up to 3 credit hours.</i>	
PWS 340 - Genetics	3.0	HONRS 499R - Honors Thesis	6.0v
REQUIREMENT 3 Complete 1 option		<i>You may take up to 3 credit hours.</i>	
OPTION 3.1 Complete 1 course		Recommended Courses: Chem 460.	
STAT 201 - Statistics for Engineers and Scientists	3.0	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.	
OPTION 3.2 Complete 2 courses			
MATH 213 - Elementary Linear Algebra	2.0		
MATH 215 - Computational Linear Algebra	1.0		
REQUIREMENT 4 Complete 1 course			
CELL 360 - Cell Biology	3.0		
CELL 362 - Advanced Physiology	3.0		
MMBIO 463 - Immunology	3.0		

REGISTRATION ADVISEMENT

We want to assist students in their academic pursuit toward an undergraduate degree. 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 number of semesters to graduate.

New 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. Transfer or mid-year incoming students should meet with an advisor prior to the add/drop deadline of their first semester, usually after the first week of class.

The department recommends a review of progress and planned registration with a faculty advisor in the semester when 30, 60, and 90 hours are completed. However, academic advisement is available to all majors at **any** point in their academic career. Contact the department advisement office to schedule an appointment with a faculty advisor: in person C104 BNSN; by phone 801- 422-6269; by email suemort@chem.byu.edu or coffice@chem.byu.edu

THE DISCIPLINE

The Biochemistry Bachelor of Science degree provides excellent preparation for students preparing for health-related fields (medicine, dentistry, veterinary medicine) or for those who desire an advanced degree (MS or PhD) in biochemistry, molecular biology, or the health sciences. 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.

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2021-2022

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. 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 Advisement

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ADVISEMENT CENTER INFORMATION

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