

BS in Chemistry (692821) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry

For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	# Classes	Hours	Classes	<u>1st Semester</u>		<u>5th Semester</u>	
Religion Cornerstones				CHEM 111	4.00	CHEM 462	1.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	MATH 112	4.00	CHEM 460	3.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	UNIV 101	2.00	CHEM 497R (opt U/G Research)	1.00
Foundations of the Restoration	1	2.00	REL C 225	Religion Cornerstone Class	2.00	CHEM 514	3.00
The Eternal Family	1	2.00	REL C 200	First Year Writing	3.00	CHEM 518	2.00
BYU Foundations for Student Success				Total Hours:	15.00	GE Religion	2.00
Foundations for Student Success	1	2.00	UNIV 101			GE Arts, Letters, Sciences	3.00
The Individual and Society				<u>2nd Semester</u>		Total Hours:	15.00
American Heritage	1 to 2	3.00-6.00	from approved list	CHEM 112	3.00	<u>6th Semester</u>	
Global and Cultural Awareness	1	3.00	from approved list	CHEM 113	2.00	CHEM 391	3.00
Skills				CHEM 201	0.50	CHEM 463	3.00
First Year Writing	1	3.00	from approved list	MATH 113	4.00	CHEM 464/465	2.00
Advanced Written and Oral Communications	1	3.00	CHEM 391*	Religion Cornerstone Class	2.00	CHEM 497R (Opt U/G Resesarch)	1.00
Quantitative Reasoning	1	4.00	MATH 112*	American Heritage	3.00	GE Arts, Letters, Sciences	3.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	Total Hours:	14.50	Global and Cultural Awareness	3.00
Arts, Letters and Sciences (Complete 6 of 7)				SOPHMORE YEAR		Total Hours:	15.00
Civilization 1	1	3.00	from approved list	<u>3rd Semester</u>		SENIOR YEAR	
Civilization 2	1	3.00	from approved list	CHEM 227	4.00	<u>7th Semester</u>	
Arts	1	3.00	from approved list	CHEM 351M	3.00	CHEM (Req 3; Opt 3.1 or 3.2)	4.00
Letters	1	3.00	from approved list	MATH 213+MATH 215	3.00	CHEM 594R	0.50
Biological Science	1	3.00-4.00	from approved list	PHSCS 121	3.00	CHEM 497R (Opt U/G Research)	1.00
Physical Science	2	7.00	CHEM 111* and PHSCS 121*	Religion Cornerstone Class	2.00	Requirement 4 Option	3.00
Social Science	1	3.00	from approved list	Total Hours:	15.00	Requirement 4 Option	3.00
Core Enrichment: Electives				<u>4th Semester</u>		GE Religion	2.00
Religion Electives	3 to 4	6.00	from approved list	CHEM 352M	3.00	Open Electives	1.00
Open Electives	Variable	Variable	personal choice	CHEM 354	2.00	Total Hours:	14.50
Graduation Requirements:				CHEM 381M	3.00	<u>8th Semester</u>	
Minimum residence hours required		30.00		GE Arts, Letters, Sciences	3.00	CHEM 495	1.00
Minimum hours needed to graduate		120.00		PHSCS 220	3.00	GE Arts, Letters, Sciences	3.00
				GE Religion Cornerstone Class	2.00	Requirement 4 Option	3.00
				Total Hours:	16.00	Requirement 4 Option	3.00
						GE Religion	2.00
						Total Hours	15.00
*These classes fill both university core and program requirements							

Program Requirements

Requirement 1 — Complete 19 Courses

Note: With department approval, Chem 105 may substitute for Chem 111; and Chem 106 for Chem 112; and Chem 107 for Chem 113. Math 314 may substitute for Chem 460. Note: 2 credit hours of Chem 354 are required.

CHEM 111 - Principles of Chemistry 1 4.0
CHEM 112 - Principles of Chemistry 2 3.0
CHEM 113 - Intro General Chemistry Lab 2.0
CHEM 201 - Chem Handling & Safe Lab Prac 0.5
CHEM 227 - Principles of Chem Analysis 4.0
CHEM 351M - Organic Chemistry 1 - Majors 3.0
CHEM 352M - Organic Chemistry 2 - Majors 3.0
CHEM 354 - Organic Chem Lab-Major 2.0
CHEM 381M - Biochem Fundamentals 3.0
CHEM 391 - Tech Writing Using Chem Lit 3.0
CHEM 460 - Math for Physical Chemistry 1.0
CHEM 462 - Physical Chemistry 1 3.0
CHEM 463 - Physical Chemistry 2 3.0
CHEM 464 - Physical Chemistry Lab 1 1.0
CHEM 465 - Physical Chemistry Lab 2 1.0
CHEM 495 - Senior Seminar 1.0
CHEM 514 - Inorganic Chemistry 3.0
CHEM 518 - Advanced Inorganic Laboratory 2.0
CHEM 594R - General Seminar - *You may take once* 0.5

Requirement 2 — Complete 6 Courses

MATH 112 - Calculus 1 4.0
MATH 113 - Calculus 2 4.0
MATH 213 - Elementary Linear Algebra 2.0
MATH 215 - Computational Linear Algebra 1.0
PHSCS 121 - Intro to Newtonian Mechanics 3.0
PHSCS 220 - Intro Electricity & Magnetism 3.0

Requirement 3 — Complete 1 of 2 Options

Complete one of the following advanced options:

Option 3.1 — Complete 1 Course

CHEM 455 - Synthesis & Qual Organic Analy 4.0

Option 3.2 — Complete 2 Courses

CHEM 521 - Instrumental Analysis Lecture 2.0
CHEM 523 - Instrumental Analysis Lab 2.0

Requirement 4 — Complete 12.0 hours

After consulting with an advisor, complete 12 hours from the following. NOTE: Only one of Bio 130 or CELL 120 can be applied to this requirement. NOTE: With approval, certain other 300-level and above courses in the allied fields of physics, statistics, engineering, and biology may be taken to satisfy this requirement. NOTE: Any course not taken to satisfy Requirement 3 can be taken to satisfy Requirement 4.

BIO 130 - Biology 4.0
CELL 120 - Science of Biology 3.0
CHEM 384 - Biochem Methods 1.0
CHEM 397R - Mentored Outreach Svc Learning - *You may take up to 3.0 credit hours* 0.5v

CHEM 455 - Synthesis & Qual Organic Analy 4.0
CHEM 482 - Mechanisms of Molecular Biol 3.0
CHEM 496R - Academic Internship - *You may take up to 3.0 credit hours* 0.5v
CHEM 498R - Capstone Experience - *You may take up to 3.0 credit hours* 0.5v
CHEM 521 - Instrumental Analysis Lecture 2.0
CHEM 523 - Instrumental Analysis Lab 2.0
CHEM 552 - Advanced Organic Chemistry 3.0
CHEM 553 - Advanced Organic Chemistry 3.0
CHEM 555 - Organic Spectroscopic Ident 2.0
CHEM 563 - Reaction Kinetics 3.0
CHEM 565 - Intro to Quantum Chemistry 3.0
CHEM 567 - Statistical Mechanics 3.0
CHEM 569 - Fundamentals of Spectroscopy 3.0
CHEM 581 - Biochemistry 3.0
CHEM 584 - Adv Biochemistry Methods 1 3.0
CHEM 586 - Adv Biochemistry Methods 2 3.0
CHEM 596R - Special Topics in Chemistry - *You may take up to 3.0 credit hours* 0.5v
HONRS 499R - Honors Thesis - *You may take up to 3.0 credit hours* 0.5v
PHSCS 123 - Intro to Waves, Optics, and Thermo 3.0

Recommended Courses are not required to complete the program

Recommended Courses: Phscs 225; Stat 201.

Note: Elective courses, beyond the requirements above, should be selected in consultation with an advisor. The following should be given consideration: advanced chemistry, foreign languages (especially French, German, Japanese, and Russian), biological sciences, computer science, engineering, mathematics, physics, statistics.

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, which usually follows 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

MENTORED RESEARCH/EXPERIENTIAL LEARNING

We strongly encourage our majors to participate in mentored learning and

receive credit toward completing their major requirements. Approximately 80% of our faculty conduct independent, externally funded research and invite undergraduates to participate in on-campus mentored learning opportunities. Students initiate contact with a faculty whose research interests them. Upon acceptance to participate in a research lab, students enroll in a series of mentored research courses (CHEM 297R, 497R) throughout their academic career, culminating in a capstone research experience (CHEM 498R). Contact the department advisement center for additional information: 801-422-6269; C104 BNSN; suemort@chem.byu.edu.

THE DISCIPLINE

The Chemistry Bachelor of Science degree is the preferred degree for chemistry majors (approved by the American Chemical Society), especially those who desire an advanced degree (MS or PhD) in chemistry. It also provides excellent preparation for individuals in preprofessional programs (e.g., medicine, dentistry, business administration, or law).

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. 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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Provo, UT 84602
Telephone: (801) 422-6269

ADVISEMENT CENTER INFORMATION

Computational, Mathematical & Physical Sciences College Advisement Center

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