BS in Biochemistry (692821) MAP Sheet

Physcial and Mathematical Sciences, Chemistry and Biochemistry
For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements

University Core Requirements:

Requirements	# Classes	Hours	Classes
Religion Cornerstones			
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275
Jesus Chirst and the Everlasting Gospel	1	2.00	REL A 250
Foundations of the Restoration	1	2.00	REL C 225
The Eternal Family	1	2.00	REL C 200
BYU Foundations for Student Success			
Foundations for Student Success	1	2.00	UNIV 101
The Individual and Society			
American Heritage	1 to 2	3.00-6.00	from approved list
Global and Cultural Awareness	1	3.00	from approved list
Skills			
First Year Writing	1	3.00	from approved list
Advanced Written and Oral Communications	1	3.00	CHEM 391*
Quantitative Reasoning	1	4.00	MATH 112*
Languages of Learning (Math of Language)	1	4.00	MATH 113*
Arts, Letters and Sciences (Complete 6 of 7)			
Civilization 1	1	3.00	from approved list
Civilization 2	1	3.00	from approved list
Arts	1	3.00	from approved list
Letters	1	3.00	from approved list
Biological Science	1	3.00-4.00	CHEM 381M*
Physical Science	2	7.00	CHEM 111* & PHSCS 121*
Social Science	1	3.00	from approved list
Core Enrichment: Electives			
Religion Electives	3 to 4	6.00	from approved list
Open Electives	Variable	Variable	personal choice
Graduation Requirements:			
Minimum residence hours requried		30.00	
Minimum hours needed to graduate		120.00	

*These classes fill both university core and program requirements

Suggested Sequence of Courses

FRESHMAN YEAR

1st Semester

CHEM 111	4.00
MATH 112	4.00
UNIV 101	2.00
Religion Cornerstone Class	2.00
American Heritage	3.00
Total Hours:	**15.00**

2nd Semester

CHEM 112	3.00
CHEM 113	2.00
CHEM 201	0.50
MATH 113	4.00
Religion Cornerstone Class	2.00
First Year Writing	3.00
Total Hours:	**14.50**

SOPHMORE YEAR

3rd Semester

CHEM 227	4.00
CHEM 351M	3.00
CHEM 297 (opt U/G research)	0.50
MATH 213 +215/STAT 201	3.00
PHSCS 121	3.00
Religion Cornerstone Class	2.00
Total Hours:	**15.50**

4th Semester

CHEM 352M	3.00
CHEM 354	2.00
CHEM 381M	3.00
GE Arts, Letters, Sciences	3.00
CHEM 384	1.00
CHEM 497R (opt U/G Research)	1.00
Religion Cornerstone Class	2.00
Total Hours:	**15.00**

JUNIOR YEAR

5th Semester

CHEM 391	3.00
CHEM 482	3.00
CHEM 584	3.00
CHEM 497R (Opt U/G Resesarch)	1.00
PHSCS 220	3.00
GE Religion	2.00
Total Hours:	**15.00**

6th Semester

CHEM 468	3.00
CHEM 586	3.00
PWS 340	3.00
Religion Elective	2.00
CHEM 497R (Opt U/G Resesarch)	1.00
GE Arts, Letters, Sciences	3.00
Total Hours:	**15.00**

SENIOR YEAR

7th Semester

CHEM 489	3.00
CHEM 594R	0.50
Requirement 5 Option	3.00
Chem 498R or Requirement 6 Option	3.00
Arts, Letters, Sciences GE	3.00
Global and Cultural Awareness	3.00
Total Hours:	**15.50**

8th Semester

CHEM 495	1.00
Requirement 6 Option	3.00
GE Religion	2.00
Arts, Letters, Sciences GE	3.00
Requirement 6 Option	1.00
Requirement 6 Option	3.00
University Elective	1.50
Total Hours:	**14.50**

Program Requirements

Requirement 1 — Complete 17 Courses

Note: With department approval Chem 105 may substitute for Chem 111; and Chem 106 for Chem 112; and Chem 107 for Chem 113. 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.

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 381M - Biochem Fundamentals 3.0
CHEM 384 - Biochem Methods 1.0
CHEM 391 - Tech Writing Using Chem Lit 3.0
CHEM 468 - Biophysical Chemistry 3.0
CHEM 482 - Mechanisms of Molecular Biol 3.0
CHEM 489 - Structural Biochemistry 3.0
CHEM 495 - Senior Seminar 1.0
CHEM 584 - Adv Biochemistry Methods 1 3.0
CHEM 586 - Adv Biochemistry Methods 2 3.0
CHEM 594R- General Seminar - *You may take up to 0.5 credit hours* 0.5

Requirement 2 — Complete 1 hour

CHEM 354 - Organic Chem Lab-Major 1.0

Requirement 3 — Complete 5 Courses

MATH 112 - Calculus 1 4.0
MATH 113 - Calculus 2 4.0
PHSCS 121 - Intro to Newtonian Mechanics 3.0
PHSCS 220- Intro Electricity & Magnetism 3.0
PWS 340 - Genetics 3.0

Requirement 4 — Complete 1 of 2 Options

Option 4.1 — Complete 1 Course
STAT 201 - Stat for Engineers & Scientist 3.0
Option 4.2 — Complete 2 Courses
MATH 213 - Elementary Linear Algebra 2.0
MATH 215 - Computational Linear Algebra 1.0

Requirement 5 — Complete 1 of 5 Courses

CELL 360- Cell Biology 3.0
CELL 362 - Advanced Physiology 3.0
MMBIO 463- Immunology 3.0
MMBIO 465 - Virology 3.0
MMBIO 368 - Genomics 3.0

Requirement 6 — Complete 10 hours

After consulting with an advisor, complete 10 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.

BIO 130 - Biology 4.0
CELL 120 - Science of Biology 3.0
CHEM 355 - Organic Lab 2 - Nonmajors 1.0
CHEM 397R - Mentored Outreach Svc Learning - *You may take once* 0.5v
CHEM 455 - Synthesis & Qual Organic Analy - *You may take up to 4.0 credit hours* 4.0
CHEM 460- Math for Physical Chemistry 1.0
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 514 - Inorganic Chemistry - *You may take up to 4.0 credit hours* 3.0
CHEM 518 - Advanced Inorganic Laboratory - *You may take up to 4.0 credit hours* 2.0
CHEM 521 - Instrumental Analysis Lecture - *You may take up to 4.0 credit hours* 2.0
CHEM 523- Instrumental Analysis Lab - *You may take up to 4.0 credit hours* 2.0
CHEM 552- Advanced Organic Chemistry - *You may take up to 4.0 credit hours* 3.0
CHEM 553 - Advanced Organic Chemistry - *You may take up to 4.0 credit hours* 3.0
CHEM 563 - Reaction Kinetics - *You may take up to 4.0 credit hours* 3.0
CHEM 565 - Intro to Quantum Chemistry - *You may take up to 4.0 credit hours* 3.0
CHEM 567 - Statistical Mechanics - *You may take up to 4.0 credit hours* 3.0
CHEM 569 - Fundamentals of Spectroscopy - *You may take up to 4.0 credit hours* 3.0
CHEM 581 - Adv Biochemical Methodology 1 - *You may take up to 4.0 credit hours* 3.0
CHEM 583 - Adv Biochemical Methodology 2 - *You may take up to 4.0 credit hours* 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, Thermo 3.0

Recommended Courses are not required to complete the program

Recommended Courses: Chem 460.

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.

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

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 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.

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

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ADVISEMENT CENTER INFORMATION

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