BS in Biochemistry (692826) MAP Sheet
Physical and Mathematical Sciences, Chemistry and Biochemistry
For students entering the degree program during the 2022-2023 curricular year.

University Core and Graduation Requirements
University Core Requirements:
Requirements#ClassesHoursClasses
Religion Cornerstones
Teachings and Doctrine of The Book of Mormon12.0REL A 275
Jesus Christ and the Everlasting Gospel12.0REL A 250
Foundations of the Restoration12.0REL C 225
The Eternal Family12.0REL C 200
The Individual and Society
American Heritage1-23.0from approved list
Global and Cultural Awareness13.0from approved list
Skills
First Year Writing13.0from approved list
Advanced Written and Oral Communications13.0CHEM 391*
Quantitative Reasoning14.0MATH 112* or 113*
Languages of Learning (Math or Language)14.0MATH 112* or 113*
Arts, Letters, and Sciences
Civilization 113.0from approved list
Arts/13.0from approved list
Letters/13.0from approved list
Biological Science14.0/3.0BIO 130* or CELL 120*
Physical Science27.0CHEM 111* and PHSCS 121*
Social Science13.0from approved list
Core Enrichment: Electives
Religion Electives3-46.0from approved list
Open Electives3-46.0from approved list
personal choice
*THERESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (21-22 hours overlap)
Graduation Requirements:
Minimum residence hours required30.0
Minimum hours needed to graduate120.0
Suggested Sequence of Courses
Freshman Year
1st Semester
CHEM 111* (F)4.0
MATH 112 (WSpSu)4.0
First-year Writing or A HTG 100 (FW)3.0
Biological Science - BIO 130 or CELL 120**3.0-4.0
Religion Cornerstone course2.0
Total Hours16.0-17.0
*With department approval, CHEM 105 may be substituted for CHEM 111. **There is no major-specific biology course required to fulfill the G.E. Biological Requirement. CELL 120 or BIO 130 are recommended options.
2nd Semester
First-year Writing or A HTG 100 (FW)3.0
CHEM 112* (W)3.0
CHEM 113* (FW) 2.0
CHEM 201 (FW) 0.5
MATH 113 (FWSpSu) 4.0
Religion Cornerstone course 2.0
Total Hours 14.5
* With department approval, CHEM 106 may be substituted for CHEM 112; CHEM 107 for CHEM 113.

Sophomore Year
3rd Semester
CHEM 227 (FSp) 4.0
STAT 201 (FW) or MATH 213 & 215 (FW) 3.0
PHSCS 121 (FWSpSu) 3.0
CHEM 351M* (F) 3.0
Religion Cornerstone course 2.0
Total Hours 15.0
*CHEM 351 may be substituted for CHEM 351M

4th Semester
CHEM 352M* (W) 3.0
CHEM 354* (FWSp) 1.0
CHEM 381M** (W) 3.0
CHEM 384 (W) 1.0
PHSCS 123 (FWSp) 3.0
CHEM 497R (FWSpSu) or open electives 1.0
Religion Cornerstone course 2.0
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. Pre-professional students may need 2 credits of CHEM 353, depending on specific professional school entrance requirements.

Junior Year
5th Semester
CHEM 391 (FW) 3.0
CHEM 482 (F) 3.0
CHEM 584 (F) 3.0
PHSCS 220 (FWSpSu) 3.0
CHEM 497R (FWSpSu) or open elective 1.0
Civilization 1 or Social Science 3.0
Total Hours 16.0

6th Semester
CHEM 586 (W) 3.0
CHEM 468 (W) 3.0
PWS 340 (FW) 3.0
CHEM 497R (FWSpSu) or Requirement 51.0
CELL 360 (FWSp) or other Requirement 43.0
Religion Elective 2.0
Total Hours 15.0

Senior Year
7th Semester
CHEM 489 (F) 3.0
CHEM 594R (FW) 0.5
CHEM 497R, 498R (FWSpSu) or Requirement 53.0
Civilization 1, 2 or Social Science 3.0
Global and Cultural Awareness 3.0
Religion Elective 2.0
Total Hours 14.5
8th Semester
CHEM 495 (FW) 1.0
CHEM 498R (FWSpSu) or other Requirement 5.0
Civilization 2 or Social Science 3.0
Arts 3.0
Letters 3.0
Religion elective 2.0
Total Hours 15.0

BS in Biochemistry (692826) 2022-2023 Program Requirements (77 Credit Hours)

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 - 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 381M - Fundamentals of Biochemistry 3.0
CHEM 384 - Biochemistry Methods 1.0
*CHEM 391 - Technical Writing Using Chemical Literature 3.0
CHEM 468 - Biophysical Chemistry 3.0
CHEM 482 - Mechanisms of Molecular Biology 3.0
CHEM 489 - Structural Biochemistry 3.0
CHEM 495 - Senior Seminar 1.0
CHEM 584 - Advanced Biochemistry Methods 1 3.0
CHEM 586 - Advanced Biochemistry Methods 2 3.0
CHEM 594R - General Seminar 0.5
requirement 2 Complete 1 hour from the following course(s)
CHEM 354 - Organic Chemistry Laboratory--Majors 2.0
requirement 3 Complete 6 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
PWS 340 - Genetics 3.0
requirement 4 Complete 1 option
option 4.1 Complete 1 course
STAT 201 - Statistics for Engineers and Scientists 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 course
After consulting with an advisor, complete 7.0 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**

**CHEM 355 - Organic Chemistry Laboratory 2 - Nonmajors 1.0**

**CHEM 397R - Mentored Outreach and Service Learning 3.0v**

**CHEM 455 - Synthesis and Qualitative Organic Analysis 4.0**

**CHEM 460 - Mathematics for Physical Chemistry 1.0**

**CHEM 496R - Academic Internship: Chemistry and Biochemistry 6.0v**
You may take up to 3 credit hours.

**CHEM 498R - Capstone Experience in Chemistry/Biochemistry 4.0v**
You may take up to 3 credit hours.

**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 - (Not currently offered)**

**CHEM 581 - Advanced Biochemical Methodology 1 3.0**

**CHEM 583 - Advanced Biochemical Methodology 2 3.0**

**CHEM 596R - Special Topics in Chemistry 3.0v**
You may take up to 3 credit hours.

**HONRS 499R - Honors Thesis 6.0v**
You may take up to 3 credit hours.

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 suemort@chem.byu.edu or coffice@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 or coffice@chem.byu.edu.

THE DISCIPLINE
The Biochemistry Bachelor of Science degree provides excellent BS in Biochemistry (692826) 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

**Department of Chemistry and Biochemistry Advisement**
Brigham Young University
C-104 BNSN
Provo, UT 84602
Telephone: (801) 422-6269

ADVISEMENT CENTER INFORMATION

**Physical and Mathematical Sciences College Advisement Center**
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674