BA in Chemistry (692827) 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

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<th>University Core Requirements</th>
<th>Suggested Sequence of Courses</th>
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<td><strong>University Core Requirements:</strong></td>
<td><strong>Suggested Sequence of Courses</strong></td>
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<td>Requirements</td>
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<td><strong>Religion Cornerstones</strong></td>
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<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
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<td>The Eternal Family</td>
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<td><strong>The Individual and Society</strong></td>
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<td>American Heritage</td>
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<td><strong>Skills</strong></td>
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<td>First Year Writing</td>
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<td>Advanced Written and Oral Communications</td>
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<td>Quantitative Reasoning</td>
<td>1</td>
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<td>Languages of Learning (Math or Language)</td>
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<td><strong>Arts, Letters, and Sciences</strong></td>
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<td>Civilization 1</td>
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<tr>
<td>Civilization 2</td>
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<td>Arts</td>
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<td>Letters</td>
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<td>Biological Science</td>
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<td>Physical Science</td>
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<td>Social Science</td>
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<td><strong>Core Enrichment: Electives</strong></td>
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<td>Religion Electives</td>
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<td>Open Electives</td>
<td>Variable</td>
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<tr>
<td>*THese Classes Fill Both University Core and Program Requirements (21-22 hours overlap)</td>
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<tr>
<td><strong>Graduation Requirements:</strong></td>
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<tr>
<td>Minimum residence hours required</td>
<td>30.0</td>
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<tr>
<td>Minimum hours needed to graduate</td>
<td>120.0</td>
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**FRESHMAN YEAR**

1st Semester
- First-year Writing or A HTG 100 (FW/Sp/Su) 3.0
- Biological Science* 3.0
- CHEM 112* (F) 4.0
- MATH 112 (FW/Sp/Su) 4.0
- Religion Cornerstone course 2.0

Total Hours: 16-17.0

2nd Semester
- First-year Writing or A HTG 100 3.0
- CHEM 112* (W) 3.0
- CHEM 113* (FW) 2.0
- CHEM 201 (FW) 0.5
- MATH 113 (FWSp) 4.0
- Religion Cornerstone course 2.0

Total Hours: 14.5

*With department approval, CHEM 106 may be substituted for CHEM 111.

**Sophomore Year**

3rd Semester
- CHEM 227 (FSP) 4.0
- CHEM 351M* (F) 3.0
- STAT 201 (FW) or MATH 213 & 215 (FW) 3.0
- PHSCS 121 (FWSp) 3.0
- Religion Cornerstone course 2.0

Total Hours: 15.0

*CHEM 351 may substitute for CHEM 351M.

4th Semester
- CHEM 352M* (W) 3.0
- CHEM 354* (FWSp) and/or CHEM 384 (W) 2.0
- PHSCS 123 (FWSp) 3.0
- CHEM 381M* (W) 3.0
- CHEM 497R or open electives 1.0
- Religion Cornerstone course 2.0

Total Hours: 14.0

*CHEM 352 may substitute for CHEM 352M; CHEM 353 may substitute for CHEM 354.

**With department approval, CHEM 481 may substitute for CHEM 381M.

**Junior Year**

5th Semester
- CHEM 462 (F) or elective 3.0
- CHEM 450 (F) or CHEM 497R or elective 1.0
- PHSCS 220 (FWSp) 3.0
- Religion elective 3.0
- Global and Cultural Awareness 3.0

Total Hours: 16.0

6th Semester
- CHEM 391 (FW) 3.0
- CHEM 463 (W) or CHEM 468 (FW) 3.0
- CHEM 464 & 465 (W) or CHEM 497R and/or elective 2.0
- Arts or Letters 3.0
- Civilization 2 3.0
- Religion Elective 2.0

Total Hours: 16.0

**Senior Year**

7th Semester
- CHEM 584 (F) or open elective 3.0
- CHEM 497R and/or other Requirement 4 6.0
- Religion elective 2.0
- Global and Cultural Awareness 3.0

Total Hours: 14.0

8th Semester
- CHEM 495 (FW) 1.0
- Requirement 4 or open elective 2.0
- Arts or Letters 3.0
- Religion elective 2.0
- CHEM 498R and open electives 6.0

Total Hours: 14.0

**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.
### BA in Chemistry (692827)
#### 2021-2022 Program Requirements (57.5 Credit Hours)

**No more than 3 hours of 0 credit is allowed in major courses.**

#### REQUIREMENT 1
1. Complete 9 courses
2. CHEM 111 - Principles of Chemistry 1 4.0
3. CHEM 112 - Principles of Chemistry 2 3.0
4. CHEM 113 - Introductory General Chemistry Laboratory 2.0
5. CHEM 201 - Chemical Handling and Safe Laboratory Practices 0.5
6. CHEM 227 4.0
7. CHEM 352M - Organic Chemistry 2 - Majors 3.0
8. CHEM 351M - Organic Chemistry 1 - Majors 3.0
9. CHEM 354 - Advanced Organic Chemistry 3.0
10. CHEM 468 - Advanced Organic Chemistry 3.0

**Note:** CHEM 355 cannot be taken if CHEM 354 was taken for 2 credit hours.

#### REQUIREMENT 2
1. Complete 1 option
2. CHEM 495 - Senior Seminar 1.0
3. CHEM 391 - Technical Writing Using Chemical Literature 3.0

**Note:** With departmental approval, CHEM 105 may substitute for CHEM 111, and CHEM 106 for CHEM 112; and CHEM 107 for CHEM 113.

#### REQUIREMENT 3
1. Complete 5 courses
2. MATH 112 - Calculus 2 4.0
3. MATH 113 - Calculus 3 4.0
4. PHYS 121 - Introduction to Waves, Optics, and Thermodynamics 3.0
5. PHYS 122 - Introduction to Electricity and Magnetism 3.0
6. PHYS 220 - Introduction to Electricity and Magnetism 3.0
7. CHEM 469R - Capstone Experience in Chemistry/Biochemistry 4.0

**Note:** Engineering, physics, and statistics may be taken to satisfy Requirement 4.

#### REQUIREMENT 4
1. Complete 3.0 credit hours from the following course(s)
2. CHEM 355 - Organic Chemistry Laboratory - Nonmajors 3.0
3. CHEM 362 - Principles of Chemical Analysis 2.0
4. CHEM 455 - Synthesis and Qualitative Organic Analysis 4.0
5. CHEM 460 - Mathematics for Physical Chemistry 1.0
6. CHEM 462 - Physical Chemistry 1 3.0
7. CHEM 463 - Physical Chemistry 2 3.0
8. CHEM 464 - Physical Chemistry Laboratory 1 1.0
9. CHEM 465 - Physical Chemistry Laboratory 2 1.0
10. CHEM 466 - Biophysical Chemistry 3.0
11. CHEM 467 - Advanced Inorganic Chemistry 3.0
12. CHEM 468 - Advanced Inorganic Laboratory 2.0
13. CHEM 469 - Structural Biochemistry 3.0
14. CHEM 470 - Statistical Mechanics 3.0
15. CHEM 471 - Reaction Kinetics 3.0
16. CHEM 472 - Inorganic Chemistry 3.0
17. CHEM 473 - Advanced Inorganic Chemistry 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 Requirement 4.

**Recommended Courses:** Math 212 and 213; CHEM 460; PHSC 225.

**Note:** Supporting courses suggested by most medical and dental schools are found by visiting the Preprofessional Advisement Center (ppa.byu.edu). 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 ADVISMENT

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 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 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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Brigham Young University
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Provo, UT 84602
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ADVISEMENT CENTER INFORMATION
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