### University Core and Graduation Requirements

#### University Core Requirements:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion Cornerstones</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>REL A 275</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>REL A 250</td>
</tr>
<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
<td>REL C 225</td>
</tr>
<tr>
<td>The Eternal Family</td>
<td>1</td>
<td>2.0</td>
<td>REL C 200</td>
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<tr>
<td>The Individual and Society</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
<td>3-6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
<td>3.0</td>
<td>CHEM 391*</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<td>4.0</td>
<td>MATH 112* or 113*</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
<td>MATH 112* or 113*</td>
</tr>
<tr>
<td>Arts, Letters, and Sciences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civilization 1</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Civilization 2</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Arts</td>
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<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Biological Science</td>
<td>1</td>
<td>3.0</td>
<td>CHEM 481M*</td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>CHEM 111* and PHSCS 121*, 123*, or 220*</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Core Enrichment: Electives</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Religion Electives</td>
<td>3-4</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
</tr>
</tbody>
</table>

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (16 hours overlap)

#### Graduation Requirements:

- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

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### Suggested Sequence of Courses

#### FRESHMAN YEAR

**1st Semester**
- First-year Writing: 3.0
- CHEM 111 (F): 4.0
- PDBIO 120 (FWSp): 3.0
- MATH 112 (FWSPSu): 4.0
- Religion Cornerstone course: 2.0

**Total Hours**: 16.0

**2nd Semester**
- CHEM 112 (W): 3.0
- CHEM 113 (FW): 2.0
- CHEM 201(FWSp): 0.5
- MATH 113 (FWSpSu): 4.0
- Religion Cornerstone course: 2.0

**Total Hours**: 15.0

#### SOPHOMORE YEAR

**3rd Semester**
- CHEM 227 (FSp): 4.0
- CHEM 351M (F): 3.0
- MATH 302 (FW): 4.0
- PHSCS 121(FWSp): 3.0
- Religion Cornerstone course: 2.0

**Total Hours**: 14.5

**4th Semester**
- CHEM 352M (W): 3.0
- CHEM 354 (FWSp): 2.0
- PHSCS 122 (FWSp): 3.0
- Religion Cornerstone course: 2.0
- Social Science: 3.0
- Open electives: 2.0

**Total Hours**: 15.0

**5th Semester**
- CHEM 455 (F): 3.0
- CHEM 462 (F): 3.0
- PHSCS 220 (FWSpSu): 3.0
- Civilization 1: 3.0
- Letters: 3.0

**Total Hours**: 15.0

**6th Semester**
- CHEM 463 (W): 3.0
- CHEM 464 (W): 1.0
- CHEM 465 (W): 1.0
- Civilization 2: 3.0
- Religion Elective: 2.0

**Total Hours**: 14.0

#### JUNIOR YEAR

**5th Semester**
- CHEM 351 may be substituted for 351M
- CHEM 352M (W): 3.0
- CHEM 354 (FWSp): 2.0
- PHSCS 122 (FWSp): 3.0
- Religion Cornerstone course: 2.0
- Social Science: 3.0
- Open electives: 2.0

**Total Hours**: 15.5

**6th Semester**
- CHEM 455 (F): 3.0
- CHEM 462 (F): 3.0
- PHSCS 220 (FWSpSu): 3.0
- Civilization 1: 3.0
- Religion Elective: 2.0
- Arts: 3.0

**Total Hours**: 14.0

**7th Semester**
- CHEM 463 (W): 3.0
- CHEM 464 (W): 1.0
- CHEM 465 (W): 1.0
- Civilization 2: 3.0
- Religion Elective: 2.0
- Arts: 3.0

**Total Hours**: 14.0

**8th Semester**
- CHEM 481M (F): 3.0
- CHEM 594R (FW): 0.5
- CHEM 514 (F): 3.0
- CHEM 518 (W): 2.0

**Total Hours**: 14.0

**9th Semester**
- CHEM 463 (W): 3.0
- CHEM 464 (W): 1.0
- CHEM 465 (W): 1.0
- Civilization 2: 3.0
- Religion Elective: 2.0
- Arts: 3.0

**Total Hours**: 14.0

**10th Semester**
- CHEM 481M (F): 3.0
- CHEM 594R (FW): 0.5
- CHEM 514 (F): 3.0
- CHEM 518 (W): 2.0

**Total Hours**: 14.0

**Note:** The department recommends a review of progress and planned registration with a faculty advisor by the end of the first week of classes in the first semester or term at BYU and in the semester when 30, 60, and 90 hours are completed. Call 422-6269 or come to C104 BNSN to schedule an appointment. New incoming 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.

Note: 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 cost and the number of semesters to graduate.
**BS in Chemistry (692821)**  
**2017-2018 Program Requirements (75.0 Credit Hours)**

**REQUIREMENT 1** Complete 21 courses  
**NOTE: WITH DEPARTMENT APPROVAL, CHEM 105 MAY SUBSTITUTE FOR CHEM 111; AND CHEM 106 FOR CHEM 112.**  
CHEM 111 - Principles of Chemistry 1  
CHEM 112 - Principles of Chemistry 2  
CHEM 113 - Introductory General Chemistry Laboratory  
CHEM 201 - Chemical Handling and Safe Laboratory Practices  
CHEM 227 - Principles of Chemical Analysis  
CHEM 351M - Organic Chemistry 1 - Majors  
CHEM 352M - Organic Chemistry 2 - Majors  
CHEM 354 - Organic Chemistry Laboratory—Majors  
*CHEM 391 - Technical Writing Using Chemical Literature  
CHEM 455 - Synthesis and Qualitative Organic Analysis  
CHEM 462 - Physical Chemistry 1  
CHEM 463 - Physical Chemistry 2  
CHEM 464 - Physical Chemistry Laboratory 1  
CHEM 465 - Physical Chemistry Laboratory 2  
*CHEM 481M - Biochemistry—Majors  
CHEM 495 - Senior Seminar  
CHEM 514 - Inorganic Chemistry  
CHEM 518 - Advanced Inorganic Laboratory  
CHEM 521 - Instrumental Analysis Lecture  
CHEM 523 - Instrumental Analysis Laboratory  
CHEM 594R - General Seminar

You may take this course up to 1 time.  

**REQUIREMENT 2** Complete 7 courses  
**NOTE: MATH 313 AND MATH 314 MAY SUBSTITUTE FOR MATH 302.**  
MATH 112 - Calculus 1  
MATH 113 - Calculus 2  
MATH 302 - Mathematics for Engineering 1  
PDBIO 120 - Science of Biology  
PHSCS 121 - Introduction to Newtonian Mechanics  
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics  
PHSCS 220 - Introduction to Electricity and Magnetism

You may take this course up to 1 time.  

**REQUIREMENT 3** Complete 3.0 hours from the following course(s)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
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</table>
| CHEM 482 - Mechanisms of Molecular Biology | 3.0
| CHEM 496R - Special Topics in Chemistry | 3.0
| CHEM 499R - Honors Thesis | 3.0
| 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 584 - Advanced Biochemistry Methods 1 | 3.0
| CHEM 586 - Advanced Biochemistry Methods 2 | 3.0

You may take up to 3 credit hours.  

The following should be given consideration: advanced chemistry, foreign languages (especially French, German, Japanese, and Russian), biological sciences, computer science, engineering, mathematics, physics, statistics.

**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 those 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.

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