### UNIVERSITY CORE AND GRADUATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Doctrinal Foundation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Book of Mormon</td>
<td>2</td>
<td>4.0</td>
<td>Rel A 121/H and 122/H</td>
</tr>
<tr>
<td>New Testament</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 211/H or 212/H</td>
</tr>
<tr>
<td>Doctrine and Covenants</td>
<td>1</td>
<td>2.0</td>
<td>Rel C 324/H or 325/H</td>
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<tr>
<td><strong>The Individual and Society</strong></td>
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<tr>
<td>American Heritage</td>
<td>1–2</td>
<td>3–6.0</td>
<td>from approved list</td>
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<tr>
<td>Global &amp; Cultural Awareness</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
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<tr>
<td>Effective Communication</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Adv Written &amp; Oral Communication</td>
<td>1</td>
<td>3.0</td>
<td>Chem 391*</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>0–1</td>
<td>0–4.0</td>
<td>Math 112* or 113*</td>
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<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
<td>Math 112* or 113*</td>
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<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
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<tr>
<td>Civilization 1 and 2</td>
<td>2</td>
<td>6.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Arts</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Letters</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Biological Science</td>
<td>1–2</td>
<td>3–5.0</td>
<td>auto-filled when qualified</td>
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<tr>
<td>Physical Science</td>
<td>2</td>
<td>6.0</td>
<td>Chem 111* and Phscs 121*, 123*, or 220*</td>
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<tr>
<td>Social Science</td>
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<td>3.0</td>
<td>from approved list</td>
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<tr>
<td><strong>Core Enrichment: Electives</strong></td>
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<td></td>
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<tr>
<td>Religion Electives</td>
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<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>
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<tr>
<td><strong>GRADUATION REQUIREMENTS:</strong></td>
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<tr>
<td>Minimum residence hours required</td>
<td></td>
<td>30.0</td>
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<tr>
<td>Minimum hours needed to graduate</td>
<td></td>
<td>120.0</td>
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</tbody>
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### PROGRAM REQUIREMENTS (57.5 total hours)

- No more than 3 hours D credit is allowed in major courses.
- The Chemistry and Biochemistry Department requires the final 10 hours of required chemistry credit to be taken in residence at BYU for this degree program.
- These hours may also go toward BYU’s 30-hour residency requirement for graduation.

**Complete the following:**

- **Chem 111** *Honors Principles of Chemistry* 3.0
- **Chem 112** Principles of Chemistry 3.0
- **Chem 113** Introductory General Chemistry Lab 2.0
- **Chem 201** Chemical Handling & Safe Lab Practices 0.5
- **Chem 227** Principles of Chemical Analysis 4.0
- **Chem 351M** Organic Chemistry - Majors 3.0
- **Chem 352M** Organic Chemistry - Majors 3.0
- **Chem 354** Organic Chemistry Laboratory - Majors 2.0
- **Chem 391** *Tech. Writing Using Chemical Literature* 3.0
- **Chem 495** Senior Seminar 1.0

**Complete one of the following options:**

- **Either**
  - **Chem 468** Biophysical Chemistry 3.0
  - **Chem 481M** Biochemistry-Majors 3.0
  - **Chem 584** Biochemistry Lab/Proteins 3.0
  - **Stat 121** Principles of Statistics 3.0
- **OR**
  - **Chem 462** Physical Chemistry 3.0
  - **Chem 463** Physical Chemistry 3.0
  - **Chem 464** Physical Chemistry Laboratory 1 1.0
  - **Chem 465** Physical Chemistry Laboratory 2 1.0
  - **Math 302** Mathematics for Engineering 1 4.0

**Complete the following:**

- **Math 112** Calculus 1 4.0
- **Math 112** Principles of Physics 1 3.0
- **Phscs 123** Principles of Physics 2 3.0
- **Phscs 220** Principles of Physics 3 3.0

**After consulting with an advisor, complete 4 hours from the following:**

- **Chem 455** Synthesis & Qualitative Organic Analysis 3.0
- **Chem 462** Physical Chemistry 3.0

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*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13.0 hours overlap)*

**FOR UNIVERSITY CORE OR PROGRAM QUESTIONS CONTACT THE ADVISEMENT CENTER**

**FACULTY ADVISOR:**

Greg Burton  
C104 BNSN  
Brigham Young University, Provo, UT 84602  
Telephone: (801) 422-6269

**Physical and Mathematical Sciences College Advisement Center**

N-181 ESC  
Brigham Young University, Provo, UT 84602  
Telephone: (801) 422-2674

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**Note 1:** Chem 500 does not count toward filling this requirement.  
**Note 2:** Elective courses must be different from required courses.  
**Note 3:** With prior approval, certain 300-level and above courses in biology, engineering, physics, and statistics may be taken to satisfy this requirement.  

**Recommended Courses:**

- **PDBio 120** Science of Biology 2.0  
- **Math 302** Mathematics for Engineering 1 4.0  
- **Math 303** Mathematics for Engineering 2 4.0  
- **Phscs 140** Electronics Lab 1.0  
- **Phscs 145** Experimental Methods in Physics 1.0  

**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.
### Suggested Sequence of Courses:

#### FRESHMAN YEAR**

**1st Semester**
- Biological Science: 3.0
- Chem 111 (F): 3.0
- First-year Writing: 3.0 or A Htg 100 (3.0)
- Math 112 (FWSpSu): 4.0
- Rel A 121: 2.0

**Total Hours:** 15.0

**2nd Semester**
- A Htg 100: 3.0 or First-year Writing: 3.0
- Chem 112 (W): 3.0
- Chem 113 (FW): 2.0
- Math 113 (FWSpSu): 4.0
- Rel A 122: 2.0

**Total Hours:** 14.0

#### SOPHOMORE YEAR**

**3rd Semester**
- Chem 227 (FSp): 4.0
- Chem 351M (F): 3.0
- Stat 121 or Math 302 (FW): 3.4
- Phscs 121 (FWSpSu): 3.0
- Rel A 211/212: 2.0

**Total Hours:** 15-16.0

**4th Semester**
- Chem 201 (F 1st blk, W 1st blk, Sp): 0.5
- Chem 352M (W): 3.0
- Chem 354 (FWSp): 2.0
- Phscs 123 (FWSp): 3.0
- Rel C 324/325: 2.0
- Electives: 4.5

**Total Hours:** 15.0

### JUNIOR YEAR**

**5th Semester**
- Chem 462 (F) or Chem 468: 3.0
- Phscs 220 (FWSp): 3.0
- Civilization I: 3.0
- Letters: 3.0
- Global and Cultural Awareness: 3.0

**Total Hours:** 15.0

**6th Semester**
- Chem 391 (FW): 3.0
- Chem 463 (W) or Chem 481: 3.0
- Chem 464 & 465: 2.0 or Chem 584 or 586: 3.0
- Arts: 3.0
- Religion Elective: 2.0

**Total Hours:** 16-17.0

### SENIOR YEAR**

**7th Semester**
- Advanced chemistry elective: 2.0
- Religion elective: 2.0
- General electives: 10-11.0

**Total Hours:** 14-15.0

**8th Semester**
- Chem 495 (FW): 1.0
- Advanced chemistry elective: 2.0
- Social Science: 3.0
- Religion elective: 2.0
- General electives: 7.0

**Total Hours:** 15.0

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**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.

**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.

### THE DISCIPLINE:

Chemistry is the study of matter, the changes undergone by matter, and the laws that govern the changes. Chemists study atoms as well as the structures and reactions of molecules. They also work to develop simplifying models (theories) that permit the correlation and explanation of observations about matter. Chemical principles are fundamental to the understanding of subjects ranging from the molecular basis of biology to the structure of rocks and minerals. Chemistry is an essential foundation in engineering disciplines, especially in chemical engineering, electronics, energy and environmental science, geology, pharmacy and medicine, and in virtually all manufacturing areas.

Chemistry is an active science that is vital to human existence. Energy needs, environmental concerns, and requirements for new materials all involve major contributions from chemists.

Examples of diverse areas of interests to chemists include regulation of protein synthesis, signal transduction at the cellular level and proteomics (biochemistry), design and synthesis of medicinal compounds (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 involves more than test tubes and beakers. It includes working with a variety of equipment and instruments such as mass spectrometers, calorimeters, chromatographs, ultracentrifuges, lasers, X-ray diffractometers, and nuclear magnetic resonance spectrometers.

### CAREER OPPORTUNITIES:

This degree is for students who want a chemistry emphasis with a liberal arts degree. It also provides excellent preparation for those individuals in preprofessional programs (e.g., medicine, dentistry, business, law).

Graduates in chemistry obtain positions in virtually every industry, and those who have imagination and intellectual curiosity are in particular demand. Chemistry is also an excellent preprofessional course of study for those interested in medicine, dentistry, law, and business. The chemistry curriculum is both rigorous and intellectually rewarding.

For more information on careers in your major, please check with the chemistry department office; the publication From Major to Career is located in all college advisement centers.

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