## UNIVERSITY CORE AND GRADUATION 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>2</td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine, Book of Mormon</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 275</td>
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<tr>
<td>Jesus Christ &amp; the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>Rel A 250</td>
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<td>Foundations of the Restoration</td>
<td>1</td>
<td>2.0</td>
<td>Rel C 225</td>
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<tr>
<td>The Eternal Family</td>
<td>1</td>
<td>2.0</td>
<td>Rel C 200</td>
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| The Individual and Society          |          |       |         |
| Citizenship                        | 1–2      | 3–6.0 | from approved list |
| Global & Cultural Awareness         | 1        | 3.0   | from approved list |

| Skills                              |          |       |         |
| Effective Communication             |          |       |         |
| First-Year Writing                  | 1        | 3.0   | from approved list |
| Adv Written & Oral Communication    | 1        | 3.0   | Chem 391* |
| Quantitative Reasoning              | 0–1      | 0–4.0 | Math 112* or 113* |
| Languages of Learning (Math or Language) | 1 | 4.0 | Math 112* or 113* |

| Arts, Letters, and Sciences         |          |       |         |
| Civilization 1 and 2                | 2        | 6.0   | from approved list |
| Arts                                | 1        | 3.0   | from approved list |
| Letters                             | 1        | 3.0   | from approved list |

| Scientific Principles & Reasoning   |          |       |         |
| Biological Science                  | 1        | 3.0   | Chem 481* |
| Physical Science                    | 2        | 6.0   | Chem 111* and Phscs 121*, 123*, or 220* |
| Social Science                      | 1        | 3.0   | from approved list |

| Core Enrichment: Electives          |          |       |         |
| Religion Electives                  | 3–4      | 6.0   | from approved list |
| Open Electives                      | Variable | Variable | personal choice |

**GRADUATION REQUIREMENTS:**
- Minimum residence hours required: 30.0
- Minimum hours needed to graduate: 120.0

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## PROGRAM REQUIREMENTS (75 total hours)

<table>
<thead>
<tr>
<th>Classes</th>
<th>Hours</th>
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<tbody>
<tr>
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<tr>
<td>1–2</td>
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<td>1–2</td>
<td>3.0</td>
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</table>

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

The Chemistry and Biochemistry Department requires the final 10 hours of required chemistry credit must 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 4.0
- †Chem 112 Principles of Chemistry 3.0
- † Note: Chem 105 and Chem 106 may substitute for Chem 111 and Chem 112 with department approval.

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<tr>
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<tbody>
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<tr>
<td>3–4</td>
<td>Variable</td>
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**Legend:**
- †: Honors course
- *: Core course

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**Note:** Math 313 and Math 314 may substitute for Math 302.

After consulting with an advisor, complete 3 hours from the following:

- **Chem 482** Mechanisms of Molecular Biology 3.0
- **Chem 496R** Acad. Internship: Chemistry & Biochem. 6.0V
- **Chem 497R** Undergrad Special Problems 6.0V
- **Chem 499R** Honors Thesis 6.0V
- **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** Biochemistry Laboratory/Proteins 3.0
- **Chem 588** Biochemistry Laboratory/Nucleic Acids 3.0
- **Chem 596R** Special Topics in Chemistry 3.0V

**Note:** With approval, certain other 300-level and above courses in the allied fields of physics, statistics, engineering, and biology may be taken to satisfy this requirement. Chem 500 does not count toward fulfilling this requirement.

**Recommended Courses:**
- **Chem 195** Freshman Seminar 0.5
- **Math 303** Mathematics for Engineering 2 4.0
- **Phscs 140** Electronics Lab 1.0
- **Phscs 145** Experimental Methods in Physics 1.0
- **Stat 201** Stats for Engineers & Scientists 3.0

**Note:** Elective courses, beyond the requirements above, should be selected in consultation with an advisor. The following should be given consideration: advanced chemistry, foreign languages (especially French, German, Japanese, and Russian), biological sciences, computer science, engineering, mathematics, physics, statistics.

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**THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (17 hours overlap)**

FOR UNIVERSITY CORE OR PROGRAM QUESTIONS CONTACT THE ADVISEMENT CENTER
Physical and Mathematical Sciences College Advisement Center
N-181 ESC
Brigham Young University, Provo, UT 84602
Telephone: (801) 422-2674

FACULTY ADVISOR:
Greg Burton
C104 BNSN
Brigham Young University, Provo, UT 84602
Telephone: (801) 422-6269
Suggested Sequence of Courses:

FRESHMAN YEAR **

1st Semester

PBio 120 2.0
Chem 111 (F) 4.0
First-year Writing 3.0
or A Htg 100 (3.0)
Math 112 (FWSpSu) 4.0
Religion Cornerstone course 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
Chem 201 0.5
Math 113 (FWSpSu) 4.0
Religion Cornerstone course 2.0

Total Hours 14.5

SOPHOMORE YEAR**

3rd Semester

Chem 227 (FSp) 4.0
Chem 351M (F) 3.0
Math 302 (FW) 4.0
Phscs 121 (FWSpSu) 3.0
Religion Cornerstone course 2.0

Total Hours 16.0

4th Semester

Chem 352M (W) 3.0
Chem 354 (FWSp) 2.0
Phscs 123 (FWSp) 3.0
Religion Cornerstone course 2.0
Social Science 3.0
Open Elective 2.0

Total Hours 15.0

3rd Semester

Chem 391 (FW) 3.0
Chem 463 (W) 3.0
Chem 464 (W) 1.0
Chem 465 (W) 1.0
Religion Elective 2.0
Open Elective 1.0

Total Hours 14.0

5th Semester

Chem 455 (F) 3.0
Chem 462 (F) 3.0
Phscs 220 (FWSp) 3.0
Civilization I 3.0
Letters 3.0

Total Hours 15.0

6th Semester

Chem 352M (W) 3.0
Chem 354 (FWSp) 2.0
Phscs 123 (FWSp) 3.0
Religion elective 2.0
Arts 3.0
Open Elective 2.0

Total Hours 15.5

7th Semester

Chem 481M (F) 3.0
Chem 594R (FW) 0.5
Chem 514 (F) 3.0
Chem 521 (F) 2.0
Religion elective 2.0
Arts 3.0
Open Elective 2.0

Total Hours 15.5

8th Semester

Chem 523 (W) 2.0
Chem 495 (FW) 1.0
Chem 518 (W) 2.0
Advanced Chemistry elective 3.0
Global and Cultural Awareness 3.0
Religion elective 2.0
Open Electives 2.0

Total Hours 15.0

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.

CAREER OPPORTUNITIES:

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

**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.