# 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>
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<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>REL A 250</td>
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<tr>
<td>Foundations of the Restoration</td>
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<td>2.0</td>
<td>REL C 225</td>
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<tr>
<td>The Eternal Family</td>
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<td>REL C 200</td>
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<tr>
<td>The Individual and Society</td>
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<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>
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<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Skills</td>
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<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
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<td>3.0</td>
<td>WRTG 316 recommended</td>
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<tr>
<td>Quantitative Reasoning</td>
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<td>4.0</td>
<td>MATH 112*</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
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<td>4.0</td>
<td>MATH 112*</td>
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<tr>
<td>Arts, Letters, and Sciences</td>
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<tr>
<td>Civilization 1</td>
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<td>3.0</td>
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</tr>
<tr>
<td>Civilization 2</td>
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<tr>
<td>Arts</td>
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<tr>
<td>Letters</td>
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<tr>
<td>Biological Science</td>
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<td>CELL 120*</td>
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<tr>
<td>Physical Science</td>
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<td>3.0</td>
<td>CHEM 105*, PHSCS 121*</td>
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<tr>
<td>Social Science</td>
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<tr>
<td>Core Enrichment: Electives</td>
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<tr>
<td>Religion Electives</td>
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<td>6.0</td>
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<tr>
<td>Open Electives</td>
<td>Variable</td>
<td>Variable</td>
<td>personal choice</td>
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</tbody>
</table>

FOR GE QUESTIONS CONTACT THE ADVISEMENT CENTER.
FOR PROGRAM QUESTIONS SEE YOUR MAJOR ADVISOR.

*ASTERISKED CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS

## 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 or American Heritage: 3.0
- CELL 120 (Biological Science): 3.0
- CHEM 302: 3.0
- CHEM 351: 3.0
- MATH 112 (Languages of Learning & Quantitative Reasoning): 4.0
- Religion Cornerstone Course: 2.0
- Total Hours: 16.0

#### 2nd Semester
- First-Year Writing or American Heritage: 3.0
- MATH 113: 4.0
- Religion Cornerstone Course: 2.0
- Global & Cultural Awareness Elective: 3.0
- Total Hours: 15.0

### SOPHOMORE YEAR

#### 3rd Semester
- MMBIO 240: 3.0
- MMBIO 241: 1.0
- CHEM 302: 3.0
- PHSCS 121: 3.0
- Civilization 1 Elective: 3.0
- Religion Cornerstone Course: 2.0
- Total Hours: 15.0

#### 4th Semester
- PWS 340: 3.0
- CHEM 302: 3.0
- CHEM 351: 3.0
- PHSCS 123: 1.0
- Civilization 2 Elective: 3.0
- Religion Cornerstone Course: 2.0
- Mentored Lab Experience (CELL 295R): 1.20
- Total Hours: 16.12

### JUNIOR YEAR

#### 5th Semester
- CELL 360: 3.0
- CHEM 481: 3.0
- PHSCS 220: 3.0
- PHSCS 225: 2.0
- Religion Elective: 2.0
- Mentored Lab Experience (CELL 495R): 1.20
- Total Hours: 14.12

#### 6th Semester
- CELL 362: 3.0
- CHEM 362: 1.0
- CHEM 468: 3.0
- Advanced Writing (WRTG 316 recommended): 3.0
- Religion Elective: 2.0
- Total Hours: 15.0

### SENIOR YEAR

#### 7th Semester
- MENTORED LAB EXPERIENCE (CELL 495R or 498): 2.5-3.0
- Arts or Letters Elective: 3.0
- Social Science Elective: 3.0
- Religion Elective: 2.0
- Total Hours: 14-14.5

#### 8th Semester
- PWS 340: 3.0
- CHEM 302: 3.0
- CHEM 351: 3.0
- PHSCS 123: 1.0
- Civilization 2 Elective: 3.0
- Religion Cornerstone Course: 2.0
- Mentored Lab Experience (CELL 295R): 1.20
- Total Hours: 17.20

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**Note:** The Senior Survey, Exit Interview, and ETS Biology Field Exam must be completed during the last semester. You will be contacted during the graduation clearance process.

**Note:** This degree program requires a minimum of 120.0 hours for graduation. 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 Biophysics (285720)**

**2021-2022 Program Requirements (72.5 - 73.5 Credit Hours)**

**REQUIREMENT 1** Complete 6 courses

**LIFE SCIENCES CORE COURSES:**

- BIO 250 - Evolutionary Medicine 2.0
- *CELL 120 - Science of Biology 3.0
- CELL 360 - Cell Biology 3.0
- MMBIO 240 - Molecular Biology 3.0
- MMBIO 241 - Molecular and Cellular Biology Laboratory 1.0
- PWS 340 - Genetics 3.0

**REQUIREMENT 2** Complete 22.0 hours from the following course(s)

**CHEMISTRY COURSES:**

- *CHEM 105 - General College Chemistry 1 with Lab (Integrated) 4.0
- CHEM 106 - General College Chemistry 2 3.0
- CHEM 107 - General College Chemistry Laboratory 1.0
- CHEM 351 - Organic Chemistry 1 3.0
- CHEM 352 - Organic Chemistry 2 3.0
- CHEM 353 - Organic Chemistry Laboratory--Nonmajors 2.0v
- CHEM 468 - Biophysical Chemistry 3.0
- CHEM 481 - Biochemistry 3.0

**REQUIREMENT 3** Complete 6 courses

**MATH AND PHYSICS COURSES:**

- *MATH 112 - Calculus 1 4.0
- MATH 121 - 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
- PHSCS 225 - Introduction to Experimental Physics 2.0

**REQUIREMENT 4** Complete 4 courses

**MAJOR CORE COURSES:**

- CELL 362 - Advanced Physiology 3.0
- CELL 363 - Advanced Physiology Laboratory 1.0
- CELL 455R - Cell Biology and Physiology Seminar 0.5
- CELL 568 - Cellular Electrophysiology and Biophysics 3.0

**REQUIREMENT 5** Complete 10.0 hours from the following option(s)

**COMPLETE 10 HOURS FROM THE FOLLOWING. AT LEAST 4 HOURS MUST COME FROM THE MENTORED EXPERIENCE AND AT LEAST 5 HOURS FROM ELECTIVES.**

**OPTION 5.1** Complete up to 5.0 hours from the following course(s)

**A. MENTORED LABORATORY EXPERIENCE [MUST BE IN AN APPROVED BIOPHYSICS LAB] (AT LEAST 4 HOURS REQUIRED):**

- CELL 295R - Introductory Undergraduate Research in Cell Biology and 2.0v

You may take up to 3 credit hours.

- CELL 495R - Advanced Undergraduate Research in Cell Biology and Physiology 4.0v
- You may take up to 3 credit hours.
- CELL 498 - Advanced Senior Research Project 3.0

**OPTION 5.2** Complete up to 6.0 hours from the following course(s)

**B. ELECTIVES (AT LEAST 5 HOURS REQUIRED):**

- CELL 365 - Pathophysiology 4.0
- CELL 459R - Readings and Discussion in Cell Biology and Physiology 2.0v
- CELL 498 - Advanced Senior Research Project 3.0
- CELL 561 - Physiology of Drug Mechanisms 3.0
- CELL 565 - Endocrinology 3.0
- CHEM 223 - Quantitative and Qualitative Analysis 4.0
- CHEM 227 - Principles of Chemical Analysis 4.0
- CHEM 482 - Mechanisms of Molecular Biology 3.0
- CHEM 489 - Structural Biochemistry 3.0
- CHEM 581 - Advanced Biochemical Methodology 1 3.0
- CHEM 582 - Advanced Biochemical Methodology 2 3.0
- CHEM 584 - Advanced Biochemical Methodology 1 3.0
- CHEM 586 - Advanced Biochemistry Methods 2 3.0
- EC EN 301 - Elements of Electrical Engineering 3.0
- MATH 302 - Mathematics for Engineering 1 4.0
- MATH 303 - Mathematics for Engineering 2 4.0
- MBBIO 441 - Advanced Molecular Biology 3.0
- MBBIO 442 - Advanced Molecular Biology Laboratory 2.0
- NEURO 480 - Advanced Neuroscience 3.0
- PHSCS 145 - Experimental Methods in Physics 1.0
- PHSCS 230 - Computational Physics Lab 1 1.0
- PHSCS 240 - Design, Fabrication, and Use of Scientific Apparatus 2.0
- STAT 121 - Principles of Statistics 3.0

**THE DISCIPLINE:**

Biophysics is the use of physics, chemistry, mathematics, and biology to investigate the physical basis of life. Upper-division courses require synthesis and integration of information from many areas of science to allow understanding of such processes as protein folding, function of ion channels, and how the nervous system works. The requirements of advanced chemistry, physics, and math courses set this major apart from other life science majors.

**CAREER OPPORTUNITIES:**

A major in biophysics prepares students to pursue advanced degrees in the biological sciences. This major also provides outstanding preparation for students seeking admittance into professional programs. Graduates of this program will also have the academic and laboratory skills necessary for direct employment in medical, biotechnological, and pharmaceutical industries. Biophysicists whose primary interest is research often work in government agencies, such as the National Institutes of Health, NASA, and the Departments of Agriculture or Defense. Many new positions have been created in industry as a result of recent developments in molecular biophysics and molecular biology. Regardless of the setting, biophysicists generally work in groups with people with different backgrounds, interests, and abilities who collaborate to solve common problems.

**MENTORED RESEARCH OPPORTUNITIES:**

Students majoring in biophysics work closely with a faculty member doing research in biophysics (CELL 295R/495R). Faculty research interests are listed under the RESEARCH tab at cell.byu.edu. Current topics include:

- Biophysics of membrane structure and function.
- Molecular and functional characterization of ligand-gated ion channels in the central nervous system.
- Molecular mechanisms of neurotransmitter release.

**FINANCING:**

Various private, federal, and university sources of scholarships, fellowships, and grants are available. Please see the Life Sciences Advisement Center (2060 LSB) for information regarding college-level and department-level scholarships. Advanced undergraduates may be hired to teach labs or help sections for CELL courses.

**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 Cell Biology and Physiology

Brigham Young University

4005 Life Sciences Building