### 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><strong>Religion Cornerstones</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of</td>
<td>1</td>
<td>2.0</td>
<td>REL A 275</td>
</tr>
<tr>
<td>Mormon</td>
<td></td>
<td></td>
<td></td>
</tr>
<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>
<td>1</td>
<td>2.0</td>
<td>REL C 225</td>
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<tr>
<td>The Eternal Family</td>
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<td>2.0</td>
<td>REL C 200</td>
</tr>
<tr>
<td><strong>The Individual and Society</strong></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><strong>Skills</strong></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>PHSCS 416 or WRTG 316</td>
</tr>
<tr>
<td><strong>Quantitative Reasoning</strong></td>
<td>1</td>
<td>4.0</td>
<td>MATH 113*</td>
</tr>
<tr>
<td>Languages of Learning (Math or Language)</td>
<td>1</td>
<td>4.0</td>
<td>MATH 113*</td>
</tr>
<tr>
<td><strong>Arts, Letters, and Sciences</strong></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>
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<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>
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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>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
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<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>PHSCS 222*</td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<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></td>
<td>personal choice</td>
</tr>
</tbody>
</table>

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (7 hours overlap)

### Graduation Requirements:

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

### Suggested Sequence of Courses

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>1st Semester</th>
<th>2nd Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSCS 121 (FWSp)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHSCS 127 (FWSp)</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 112 (FWSpSu)</td>
<td>4.0</td>
</tr>
<tr>
<td>First-year Writing</td>
<td>3.0</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Total Hours:** 15.0

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>3rd Semester</th>
<th>4th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSCS 220 (FWSp)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHSCS 227 (FW)</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 291 (FW)</td>
<td>0.5</td>
</tr>
<tr>
<td>MATH 302 (FW)</td>
<td>4.0</td>
</tr>
<tr>
<td>Religion Cornerstone course</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Total Hours:** 14.0

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>5th Semester</th>
<th>6th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSCS 318 (FW)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHSCS 321 (FSp)</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 330 (FSp)</td>
<td>1.0</td>
</tr>
<tr>
<td>Civilization 1</td>
<td>3.0</td>
</tr>
<tr>
<td>Social Science</td>
<td>3.0</td>
</tr>
<tr>
<td>Religion Elective</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Total Hours:** 15.0

#### SENIOR YEAR

<table>
<thead>
<tr>
<th>7th Semester</th>
<th>8th Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSCS 416 (W)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHSCS 426 (W)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHSCS 360 (W) or 471 (WSpSu)</td>
<td>3.0</td>
</tr>
<tr>
<td>General Elective</td>
<td>2.0</td>
</tr>
<tr>
<td>Religion Elective</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Total Hours:** 14.0

**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.
### REQUIREMENT 1
Complete 1 option

**OPTION 1.1**
Complete 20 courses
- C S 111 - Introduction to Computer Science
- MATH 113 - Calculus 2
- PHSCS 121 - Introduction to Newtonian Mechanics
- PHSCS 122 - Introduction to Waves, Optics, and Thermodynamics
- PHSCS 127 - Descriptive Astronomy
- PHSCS 191 - Introduction to Physics Careers and Research 1
- PHSCS 200 - Introduction to Electricity and Magnetism
- PHSCS 222 - Modern Physics
- PHSCS 227 - Solar System Astronomy
- PHSCS 228 - Stellar and Extragalactic Astronomy
- PHSCS 230 - Computational Physics Lab 1
- PHSCS 291 - Introduction to Physics Careers and Research 2
- PHSCS 318 - Introduction to Mathematical Physics
- PHSCS 321 - Mechanics
- PHSCS 329 - Observational Astronomy
- PHSCS 330 - Computational Physics Lab 2
- PHSCS 427 - Stellar Astrophysics
- PHSCS 428 - Galaxies and Cosmology
- PHSCS 441 - Electricity and Magnetism
- PHSCS 451 - Quantum Mechanics

**OPTION 1.2**
Complete 3 courses
- MATH 215 - Computational Linear Algebra
- MATH 314 - Calculus of Several Variables
- MATH 334 - Ordinary Differential Equations

**OPTION 1.3**
Complete 2 courses
- MATH 302 - Mathematics for Engineering 1
- MATH 303 - Mathematics for Engineering 2

**OPTION 1.4**
Complete 2 courses
- MATH 313 - (Not currently offered)
- MATH 314 - Calculus of Several Variables
- MATH 334 - Ordinary Differential Equations

### REQUIREMENT 2
Complete 1 option
- PHSCS 441 - Quantum Mechanics
- PHSCS 428 - Galaxies and Cosmology
- PHSCS 318 - Introduction to Mathematical Physics
- PHSCS 452 - Applications of Quantum Mechanics

**OPTION 2.1**
Complete 3.0 hours from the following course(s)
- PHSCS 360 - Statistical and Thermal Physics
- PHSCS 442 - Electrodynamics
- PHSCS 452 - Applications of Quantum Mechanics
- PHSCS 471 - Principles of Optics

**OPTION 2.2**
Complete 0.5 hours from the following course(s)
- PHSCS 191 - Introduction to Physics Careers and Research 1
- PHSCS 200 - Introduction to Electricity and Magnetism
- PHSCS 222 - Modern Physics
- PHSCS 227 - Solar System Astronomy
- PHSCS 228 - Stellar and Extragalactic Astronomy
- PHSCS 230 - Computational Physics Lab 1
- PHSCS 291 - Introduction to Physics Careers and Research 2
- PHSCS 318 - Introduction to Mathematical Physics
- PHSCS 321 - Mechanics
- PHSCS 329 - Observational Astronomy
- PHSCS 330 - Computational Physics Lab 2
- PHSCS 427 - Stellar Astrophysics
- PHSCS 428 - Galaxies and Cosmology
- PHSCS 441 - Electricity and Magnetism
- PHSCS 451 - Quantum Mechanics

### REQUIREMENT 3
Complete 2 courses
- MATH 213 - Elementary Linear Algebra
- MATH 215 - Computational Linear Algebra

### REQUIREMENT 4
Complete 1 option

**OPTION 3.1**
Complete 2 courses
- MATH 302 - Mathematics for Engineering 1
- MATH 303 - Mathematics for Engineering 2
- MATH 313 - (Not currently offered)
- MATH 314 - Calculus of Several Variables
- MATH 334 - Ordinary Differential Equations

**OPTION 3.2**
Complete 2.0 hours from the following course(s)
- PHSCS 498R - Senior Thesis

**OPTION 4.1**
Complete 2.0 hours from the following course(s)
- PHSCS 498R - Senior Thesis

### REQUIREMENT 5
Complete 1 option

**SENIOR THESIS:**
Complete a senior thesis, including the following:
- A. Choose a research mentor and group as early as possible, starting with information in Phscs 191 and 192, and discussions with faculty, your advisor, and the senior thesis coordinator. It is best to start as a freshman or sophomore. Some internships may qualify for your project.

**OPTION 4.1**
Complete 2.0 hours from the following course(s)
- PHSCS 498R - Senior Thesis

### The Discipline:
Over the centuries physicists and astronomers have studied the fundamental principles that govern the structure and dynamics of matter and energy in the physical world, from subatomic particles to the cosmos. Physicists also apply this understanding to the development of new technologies. For example, physicists invented the first lasers and semiconductor electronic devices.

### CAREER OPPORTUNITIES:
A degree in physics or physics-astronomy can provide:
1. Preparation for those who intend to enter industrial or governmental service as physicists or astronomers.
2. Education for those who intend to pursue graduate work in physics or astronomy.
3. Education in the subject matter of physics for prospective teachers of the physical sciences.
4. Undergraduate education for those who will pursue graduate work in the professions: business (e.g., an MBA), law, medicine, etc.
5. Fundamental background for other physical sciences and engineering, in preparation for graduate study in these fields.
6. Physics fundamentals required by the biological science, medical, dental, nursing, and related programs.

For more information, see www.physics.byu.edu/undergraduate/careers.
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
FACULTY ADVISORS ASSIGNED BY LAST TWO DIGITS OF BYU ID NUMBER. CONTACT:

Department of Physics and Astronomy
Brigham Young University
N-283 ESC
Provo, UT 84602
Telephone: (801) 422-4361

ADVISEMENT CENTER INFORMATION
Physical and Mathematical Sciences College Advisement Center
Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674