### University Core and Graduation Requirements

#### University Core Requirements:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>#Classes</th>
<th>Hours</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes</td>
<td></td>
<td></td>
<td></td>
</tr>
<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>
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<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>
</tr>
<tr>
<td>Classes</td>
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<td></td>
</tr>
<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>Classes</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Skills</td>
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<td></td>
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</tr>
<tr>
<td>First Year Writing</td>
<td>1</td>
<td>3.0</td>
<td>PHSCS 416 or WRTG 316</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>Quantitative Reasoning</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>Classes</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Arts, Letters, and Sciences</td>
<td></td>
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</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>
<td>1</td>
<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>3-4.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Physical Science</td>
<td>1</td>
<td>3.0</td>
<td>PHSCS 222*</td>
</tr>
<tr>
<td>Social Science</td>
<td>1</td>
<td>3.0</td>
<td>from approved list</td>
</tr>
<tr>
<td>Classes</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Core Enrichment: Electives</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>Variable</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

**1st Semester**
- PHSCS 221 (FWSp) 3.0
- PHSCS 191 (F) 0.5
- MATH 112 (FWSpSu) 4.0
- First-Year Writing 3.0
- General Electives 2.0
- Religion Cornerstone course 2.0
- Total Hours 14.5

**2nd Semester**
- PHSCS 123 (FWSp) 3.0
- MATH 113 (FWSpSu) 4.0
- C S 142 (FWSp) 3.0
- American Heritage 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.0

#### SOPHOMORE YEAR

**3rd Semester**
- PHSCS 220 (FWSp) 3.0
- PHSCS 225 (FW)** 2.0
- PHSCS 230 (FW) 1.0
- PHSCS 291 (F) 0.5
- MATH 302 (FW)** 4.0
- Biological Science 3.0
- Religion Cornerstone course 2.0
- Total Hours 15.5

**4th Semester**
- PHSCS 222 (FWSp) 3.0
- PHSCS 240 (FW) 2.0
- MATH 303 (FW) 4.0
- General Elective 3.0
- Religion Cornerstone course 2.0
- Total Hours 14.0

#### JUNIOR YEAR

**5th Semester**
- PHSCS 245 (FW) 2.0
- PHSCS 318 (FW) 3.0
- PHSCS 321 (FSp) 3.0
- PHSCS 330 (FSp) 1.0
- General Elective 3.0
- Religion Elective 2.0
- Total Hours 14.0

**6th Semester**
- PHCS 360 (W) 3.0
- PHCS 430 (WSu) 3.0
- Arts 3.0
- Civilization 1 3.0
- Global & Cultural Awareness 3.0
- Religion Elective 2.0
- Total Hours 15.0

#### SENIOR YEAR

**7th Semester**
- PHCS 418 (W) 3.0
- PHCS 442 (WSu) 3.0
- PHCS 452 (W) 3.0
- PHCS 471 (WSu) 3.0
- PHCS 498 (Senior Thesis credit; FWSpSu) 2.0
- General Elective 2.0
- Total Hours 16.0

**8th Semester**
- PHCS 416 (W) 3.0
- PHCS 442 (WSu) 3.0
- PHCS 452 (W) 3.0
- PHCS 471 (WSu) 3.0
- PHCS 498 (Senior Thesis credit; FWSpSu) 2.0
- General Elective 2.0
- Total Hours 16.0

### 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.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Requirement 1</strong></td>
<td>Complete 22 courses.</td>
</tr>
<tr>
<td><strong>PHSCS 191</strong></td>
<td>Should be taken the first semester as a sophomore.</td>
</tr>
</tbody>
</table>

**Note:**
- **PHSCS 291** should be taken the first semester as a sophomore.
- **PHSCS 471**
- **PHSCS 452**
- **PHSCS 451**
- **PHSCS 442**
- **PHSCS 441**
- **PHSCS 430**
- **PHSCS 360**
- **PHSCS 330**
- **PHSCS 318**
- **PHSCS 291**
- **PHSCS 245**
- **PHSCS 240**
- **PHSCS 230**
- **PHSCS 225**
- **PHSCS 220**

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<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td><strong>Requirement 2</strong></td>
<td>Complete 2 courses.</td>
</tr>
<tr>
<td><strong>MATH 113</strong></td>
<td>Calculus 1</td>
</tr>
<tr>
<td><strong>PHSCS 191</strong></td>
<td>Introduction to Computer Programming</td>
</tr>
</tbody>
</table>

**Note:**
- **PHSCS 191** should be taken the first semester as a freshman.
- Introduction to Computer Programming
- Principles of Optics
- Electrodynamics
- Electricity and Magnetism
- Computational Physics Lab 3
- Statistical and Thermal Physics
- Mechanics
- Introduction to Mathematical Physics
- Philosophy and the Physical Sciences
- Mechanics
- Introduction to Physics Careers and Research 2
- Experiments in Contemporary Physics
- Design, Fabrication, and Use of Scientific Apparatus
- Computational Physics Lab 1
- Introduction to Experimental Physics
- Introduction to Electricity and Magnetism
- Introduction to Physics Careers and Research 1
- Introduction to Waves, Optics, and Thermodynamics
- Introduction to Newtonian Mechanics
- Calculus 2
- Modern Physics
- Calculus of Several Variables
- Computational Linear Algebra
- Elementary Linear Algebra
- Ordinary Differential Equations
- Calculus of Several Variables
- Mathematics for Engineering 2
- Mathematics for Engineering 1

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<tr>
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<tr>
<td><strong>Requirement 3</strong></td>
<td>Complete 1 option</td>
</tr>
<tr>
<td><strong>SENIOR THESIS</strong></td>
<td>Complete a senior thesis, including the following:</td>
</tr>
<tr>
<td></td>
<td>A. Choose a research mentor and group as early as possible, starting with information in Phscs 191 and 291, and discussion with faculty, your advisor and senior thesis coordinator. It is best to start as a freshman or sophomore. Interdisciplinary work in other departments or in internships is possible.</td>
</tr>
<tr>
<td></td>
<td>B. PHSCS 499R - Senior Thesis</td>
</tr>
</tbody>
</table>

**Note:**
- You may take up to 2 credit hours.

<table>
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<tr>
<th>Requirement</th>
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<tr>
<td><strong>Requirement 4</strong></td>
<td>Complete 4 courses</td>
</tr>
<tr>
<td><strong>PHSCS 191</strong></td>
<td>Should be taken the last semester before they graduate. The test is a standardized assessment of undergraduate physics written by ETS (Educational Testing Service). The ETS website contains a description of the exam and sample problems: <a href="http://www.ets.org/mft/about/content/physics">http://www.ets.org/mft/about/content/physics</a>. Results of the exam do not appear on the transcript or affect the GPA. Students should contact the Physics undergraduate secretary to make arrangements for taking the exam; typically it’s done in the Testing Center before mid-semester.</td>
</tr>
</tbody>
</table>

**Note:**
- Students planning careers in experimental, applied, or industrial physics should complete Stat 201.
- You may take up to 2 credit hours.

**Note 2:**
- All students will benefit, through courses or individual study, by learning programming skills and numerical methods beyond what you are taught in C S 142 and our computational physics courses. Consider the following: C S courses, Math 410, Me En 373.

**Note 3:**
- Students planning graduate school in physics should learn complex analysis. Consider the following: Math 332, Phscs 601, 602.

**Requirement 3**
- Complete 1 option |

<table>
<thead>
<tr>
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<tr>
<td><strong>THE DISCIPLINE</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>PHYSICS and ASTRONOMY</strong></td>
<td>Physics and astronomy students learn to approach complex problems in science and technology from a broad background in mechanics, electricity and magnetism, statistical and thermal physics, quantum mechanics, relativity, and optics. The tools they develop at BYU include problem solving by mathematical and computational modeling, as well as experimental discovery and analysis. All students gain professional experience in a research, capstone, or internship project, usually in close association with faculty. Together these experiences can provide excellent preparation for employment or for graduate studies in physics, other sciences, engineering, medicine, law, or business.</td>
</tr>
</tbody>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>CAREER OPPORTUNITIES</strong></td>
<td>Most physicists and astronomers work in research and development in industrial, government, or university labs to solve new problems in technology and science. They also share the beauty discovered in our physical universe by teaching in schools, colleges, and universities.</td>
</tr>
</tbody>
</table>
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 on careers in your major, 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
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