# University Core and Graduation Requirements

## University Core Requirements:

### Religion Cornerstones
- Teachings and Doctrine of The Book of Mormon
  - REL A 275
- Jesus Christ and the Everlasting Gospel
  - REL A 250
- Foundations of the Restoration
  - REL C 225
- The Eternal Family
  - REL C 200

### The Individual and Society

#### American Heritage
- 1-2 credits from approved list

#### Global and Cultural Awareness
- 1 credit from approved list

### Skills

#### First Year Writing
- 1 credit from approved list

#### American Heritage
- 1-2 credits from approved list

#### Quantitative Reasoning (Math or Language)
- 1 credit from approved list

### Arts, Letters, and Sciences

#### Civilization 1
- 1 credit from approved list

#### Civilization 2
- 1 credit from approved list

#### Arts
- 1 credit from approved list

#### Letters
- 1 credit from approved list

#### Physical Science
- 1 credit from approved list

#### Social Science
- 1 credit from approved list

### Core Enrichment: Electives

#### Religion Electives
- 3-4 credits from approved list

#### Open Electives
- Variable credits

*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 121 (FWSp)
- PHSCS 127 (FWSp)
- PHSCS 191 (F)
- MATH 112 (FWSpSu)
- First-year Writing
- Religion Cornerstone course
- Total Hours: 15.5

#### 2nd Semester
- PHSCS 123 (FWSp)
- MATH 113 (FWSpSu)
- C S 142
- American Heritage
- Religion Cornerstone course
- Total Hours: 15.0

### Sophomore Year

#### 3rd Semester
- PHSCS 220 (FWSp)
- PHSCS 227 (F)
- PHSCS 230 (FW)
- PHSCS 291 (F)
- MATH 302 (FW)
- Religion Cornerstone course
- Total Hours: 15.5

#### 4th Semester
- The MATH 213/215/314/334 (9 cr) sequence can be taken in place of the MATH 302/303 (8 cr) sequence.
- PHSCS 416 (W)
- PHSCS 428 (W)
- MATH 303 (FW)
- Biological Science
- Religion Cornerstone course
- Total Hours: 15.0

### Junior Year

#### 5th Semester
- PHSCS 318 (FW)
- PHSCS 321 (FSpS)
- PHSCS 330 (FSp)
- MATH 112 (FWSpSu)
- Civilizations 1
- Social Science
- Religion Elective
- Total Hours: 15.0

#### 6th Semester
- PHSCS 329 (FW)
- PHSCS 360 (W) or 471 (WSu) (requirement 2)
- Arts
- Civilization 2
- General Elective
- Religion Elective
- Total Hours: 18.0

### Senior Year

#### 7th Semester
- PHSCS 416 (W)
- PHSCS 428 (W)
- PHSCS 360 (W) or 442 (WSu) or 471 (FW) (requirement 2)
- General Elective
- Religion Elective
- Total Hours: 14.0

#### 8th Semester
- The MATH 213/215/314/334 (9 cr) sequence can be taken in place of the MATH 302/303 (8 cr) sequence.
- PHSCS 498R (Senior thesis credit; FWSpSu)
- Global and Cultural Awareness
- 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

<table>
<thead>
<tr>
<th>Option 1.1</th>
<th>Complete 20 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 142 - Introduction to Computer Programming</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 113 - Calculus 2</td>
<td>4.0</td>
</tr>
<tr>
<td>PHYS 121 - Introduction to Newtonian Mechanics</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 123 - Introduction to Waves, Optics, and Thermodynamics</td>
<td>3.0</td>
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<tr>
<td>PHYS 127 - Descriptive Astronomy</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 191 - Introduction to Physics Careers and Research 1</td>
<td>0.5</td>
</tr>
<tr>
<td>PHYS 220 - Introduction to Electricity and Magnetism</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 222 - Modern Physics</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 227 - Solar System Astronomy</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 228 - Stellar and Extragalactic Astronomy</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 230 - Computational Physics Lab 1</td>
<td>1.0</td>
</tr>
<tr>
<td>PHYS 291 - Introduction to Physics Careers and Research 2</td>
<td>0.5</td>
</tr>
<tr>
<td>PHYS 318 - Introduction to Mathematical Physics</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 321 - Mechanics</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 329 - Observational Astronomy</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 330 - Computational Physics Lab 2</td>
<td>1.0</td>
</tr>
<tr>
<td>PHYS 427 - Stellar Astrophysics</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 428 - Galaxies and Cosmology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 441 - Electricity and Magnetism</td>
<td>3.0</td>
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<tr>
<td>PHYS 451 - Quantum Mechanics</td>
<td>3.0</td>
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</tbody>
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Note: Phscs 291 should be taken the first semester as a freshman. Phscs 291 should be taken the first semester as a sophomore.

### REQUIREMENT 2
Complete 2 courses

| PHYS 360 - Statistical and Thermal Physics | 3.0 |
| PHYS 442 - Electrodynamics | 3.0 |
| PHYS 452 - Applications of Quantum Mechanics | 3.0 |
| PHYS 471 - Principles of Optics | 3.0 |

### REQUIREMENT 3
Complete 1 option

<table>
<thead>
<tr>
<th>Option 3.1</th>
<th>Complete 2 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 302 - Mathematics for Engineering 1</td>
<td>4.0</td>
</tr>
<tr>
<td>MATH 303 - Mathematics for Engineering 2</td>
<td>4.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option 3.2</th>
<th>Complete 3 courses</th>
</tr>
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<tbody>
<tr>
<td>MATH 313 - (Not currently offered)</td>
<td></td>
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<tr>
<td>MATH 314 - Calculus of Several Variables</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 334 - Ordinary Differential Equations</td>
<td>3.0</td>
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</tbody>
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<thead>
<tr>
<th>Option 3.3</th>
<th>Complete 4 courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 213 - Elementary Linear Algebra</td>
<td>2.0</td>
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</tbody>
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### REQUIREMENT 4
Complete 1 option

| PHYS 498R - Senior Thesis | 3.0 |

### REQUIREMENT 5
Students are required to take the Physics "Major Field Test" 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: http://www.ets.org/mft/about/content/physics. 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.

Note: Students planning an graduate school in astronomy should consider taking all four of Phscs 360, 442, 452, 471, instead of only two. Gain statistics computer programming skills beyond what you get in this major by taking courses such as Stat 201 (Statistics for Engineers and Scientists) and courses such as Phscs 430 (Computational Physics 3) and Me En 373 (Introduction to Scientific Computing).

### 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.

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.

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 high schools, colleges, and universities.

### 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.
BS in Physics and Astronomy (694832)
2021-2022

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:

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