### 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>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
<td>2.0</td>
<td>REL A 250</td>
</tr>
<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>
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<td>2.0</td>
<td>REL C 200</td>
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<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>SC ED 353*</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
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</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 ENGL 316</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1</td>
<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>
</tr>
<tr>
<td>Arts, Letters, and Sciences</td>
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<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>
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<tr>
<td>Letters</td>
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<td>3.0</td>
<td>PHIL 423*</td>
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<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>
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<tr>
<td>Core Enrichment: Electives</td>
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<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 (13 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:
- First-year Writing: 3.0
- MATH 112 (FWSpSu): 4.0
- PHSCS 121 (FWSp): 3.0
- PHSCS 191 (F): 0.5
- Religion Cornerstone course: 2.0
- General electives: 1.5
- Total Hours: 14.0

2nd Semester:
- American Heritage: 3.0
- MATH 113 (FWSpSu): 4.0
- PHSCS 123 (FWSp): 3.0
- PHSCS 140 (WSp): 1.0
- Biological Science: 3.0
- Religion Cornerstone course: 2.0
- Total Hours: 16.0

#### Sophomore Year

3rd Semester:
- PHYS S 276 (FW): 4.0
- PHSCS 145 (FSu): 4.0
- PHSCS 220 (FWSu): 3.0
- Religion Cornerstone course: 2.0
- Total Hours: 14.0

4th Semester:
- MATH 302 (FW): 4.0
- PHYS S 376 (FW): 4.0
- PHYS S 378 (FWSpSu): 3.0
- Religion Cornerstone course: 2.0
- Letters: 3.0
- Total Hours: 16.0

#### Junior Year

5th Semester:
- PHYS S 476R or 496R (FW): 12.0
- Total Hours: 12.0

6th Semester:
- PHYS S 476R or 496R (FW): 12.0
- Total Hours: 12.0
REQUIREMENT 1 Complete 11 courses
NOTE: PHCS 191 SHOULD BE TAKEN THE FIRST SEMESTER.
* MATH 112 - Calculus 1 4.0
MATH 113 - Calculus 2 4.0
PHCS 121 - Introduction to Newtonian Mechanics 3.0
PHCS 123 - Introduction to Waves, Optics, and Thermodynamics 3.0
PHCS 127 - Descriptive Astronomy 3.0
PHCS 140 - Electronics Lab 1.0
PHCS 145 - Experimental Methods in Physics 1.0
PHCS 191 - Introduction to Physics Careers and Research 1 0.5
PHCS 220 - Introduction to Electricity and Magnetism 3.0
*PHCS 222 - Modern Physics 3.0
PHCS 240 - Design, Fabrication, and Use of Scientific Apparatus 2.0

REQUIREMENT 2 Complete 1 option
OPTION 2.1 Complete 2 courses
MATH 302 - Mathematics for Engineering 1 4.0
MATH 303 - Mathematics for Engineering 2 4.0

OPTION 2.2 Complete 3 courses
MATH 313 - Elementary Linear Algebra 3.0
MATH 314 - Calculus of Several Variables 3.0
MATH 334 - Ordinary Differential Equations 3.0

REQUIREMENT 3 Complete 1 course
PHCS 310 - Physics By Inquiry: Mechanics 3.0
PHCS 311 - Physics By Inquiry: Electricity 3.0

REQUIREMENT 4 Complete 9.0 hours from the following option(s)
PHYSICS ELECTIVES: COMPLETE AN ADDITIONAL 9 HOURS FROM THE FOLLOWING (ANY PHYSICS COURSE ALREADY TAKEN WILL NOT DOUBLE COUNT).

OPTION 4.1 Complete up to 3.0 hours from the following course(s)

OPTION 4.2 Complete up to 9.0 hours from the following course(s)
COMPLETE AT LEAST 6 HOURS FROM 300-, 400-, OR 500-LEVEL PHYSICS COURSES, NOT INCLUDING 310 OR 311 OR 399R (PHCS 321, 461, AND 471 ARE HIGHLY RECOMMENDED).

PHCS 313R - Special Topics in Physics 3.0v
PHCS 318 - Introduction to Mathematical Physics 3.0
PHCS 321 - Mechanics 3.0
PHCS 329 - Observational Astronomy 3.0
PHCS 330 - Computational Physics Lab 2 1.0
PHCS 360 - Statistical and Thermal Physics 3.0
PHCS 391R - Seminar in Current Physics 1.0
PHCS 416 - Writing in Physics 3.0
PHCS 427 - Introduction to Astrophysics 3.0
PHCS 428 - Introduction to Astrophysics 3.0
PHCS 430 - Computational Physics Lab 3 1.0
PHCS 441 - Electrostatics and Magnetism 3.0
PHCS 442 - Electrodynamics 3.0
PHCS 451 - Quantum Mechanics 3.0
PHCS 452 - Applications of Quantum Mechanics 3.0
PHCS 461 - Introduction to Acoustics 3.0
PHCS 471 - Principles of Optics 3.0
PHCS 477R - Secondary Minor Student Teaching 4.0
PHCS 492R - Capstone Project in Applied Physics 2.0
PHCS 497R - Research in Physics 3.0v
PHCS 498R - Senior Thesis 3.0v
PHCS 540 - Electrical Engineering Principles and Practices for Physic 2.0
PHCS 561 - (Phcs-Me En) Fundamentals of Acoustics 3.0
PHCS 571 - Lasers and Atoms 3.0
PHCS 581 - Solid-State Physics 3.0
PHCS 583 - Physics of Nanostructures, Surfaces, and Interfaces 3.0
PHCS 585 - Thin-Film Physics 3.0

PHSCS 586 - Transmission Electron Microscopy for Physical Science ai 3.0
PHSCS 587 - Physics of Semiconductor Devices 3.0
PHSCS 588 - Scanning Electron Microscopy (SEM) for Physical Science 3.0
PHSCS 599R - Academic Internship 9.0v

REQUIREMENT 5 Complete 2 options

PROFESSIONAL EDUCATION COMPONENT:
Licensure requirements: Contact Education Student Services, 350 MCKB, 422-3426, to schedule the final interview to clear your application for the secondary teaching license. You should be registered for your last semester at BYU prior to the scheduled appointment.

OPTION 5.1 Complete 9 courses
CPSE 402 - Educating Students with Disabilities in Secondary Classro 2.0
IP&T 371 - Integrating K-12 Educational Technology 1 0.0
IP&T 372 - Integrating K-12 Educational Technology 2 1.0
IP&T 373 - Teaching in K-12 Online and Blended Learning Contexts 1.0
PHY S 276 - Exploration of Teaching 4.0
PHY S 377 - Teaching Methods and Instruction 3.0
PHY S 378 - Practicum in Secondary Education 1.0
*SC ED 353 - Multicultural Education for Secondary Education 3.0
SC ED 375 - Adolescent Development and Classroom Management 3.0

Note: FBI fingerprint and background clearance must be completed prior to enrollment in Phy S 276.

OPTION 5.2 Complete 12.0 hours from the following course(s)
PHY S 476 - Secondary Student Teaching 12.0v
PHY S 496 - Academic Internship: Secondary Education 12.0v

Student teachers/interns must complete three forms in their LiveText accounts (PIBS, CDS, FED) and attach their TWS to the LiveText account for their program. All four must be completed to be cleared for graduation.

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.

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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