**BS in Physics Teaching (694828) MAP Sheet**

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2017-2018 curricular year.

This major is designed to prepare students to teach in public schools. In order to graduate with this major, students are required to complete Utah State Office of Education licensing requirements. To view these requirements go to http://education.byu.edu/ess/licensing.html or contact Education Student Services, 350 MCKB, (801) 422-3426.

### University Core and Graduation 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 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>
<td>1</td>
<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>2.0</td>
<td>SC ED 353*</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 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>
<td>1</td>
<td>4.0</td>
<td>MATH 112*</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>
<td>1</td>
<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>PHIL 423*</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>
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<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>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

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**Suggested Sequence of Courses**

<table>
<thead>
<tr>
<th>FRESHMAN YEAR</th>
<th>JUNIOR YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Semester</td>
<td>1st Semester</td>
</tr>
<tr>
<td>Total Hours: 14.0</td>
<td>6th Semester</td>
</tr>
<tr>
<td><strong>Total Hours: 16.0</strong></td>
<td></td>
</tr>
<tr>
<td>2nd Semester</td>
<td></td>
</tr>
<tr>
<td>Total Hours: 16.0</td>
<td></td>
</tr>
<tr>
<td>3rd Semester</td>
<td>7th Semester</td>
</tr>
<tr>
<td>Total Hours: 14.0</td>
<td></td>
</tr>
<tr>
<td>4th Semester</td>
<td>8th Semester</td>
</tr>
<tr>
<td>Total Hours: 16.0</td>
<td></td>
</tr>
<tr>
<td>5th Semester</td>
<td></td>
</tr>
<tr>
<td>Total Hours: 12.0</td>
<td></td>
</tr>
<tr>
<td>6th Semester</td>
<td></td>
</tr>
<tr>
<td>Total Hours: 12.0</td>
<td></td>
</tr>
<tr>
<td>7th Semester</td>
<td></td>
</tr>
<tr>
<td>Total Hours: 12.0</td>
<td></td>
</tr>
<tr>
<td>8th Semester</td>
<td></td>
</tr>
<tr>
<td>Total Hours: 12.0</td>
<td></td>
</tr>
</tbody>
</table>

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 9 courses

NOTE: PHYSICS 191 SHOULD BE TAKEN THE FIRST SEMESTER.

PHYSICS 121 - Introduction to Newtonian Mechanics 3.0
PHYSICS 123 - Introduction to Waves, Optics, and Thermodynamics 3.0
PHYSICS 127 - Descriptive Astronomy 3.0
PHYSICS 140 - Electronics Lab 1.0
PHYSICS 145 - Experimental Methods in Physics 1.0
PHYSICS 191 - Introduction to Physics Careers and Research 1.0
PHYSICS 220 - Introduction to Electricity and Magnetism 3.0
PHYSICS 322 - Modern Physics 3.0
PHYSICS 340 - Design, Fabrication, and Use of Scientific Apparatus 2.0

REQUIREMENT 2
Complete 1 option

OPTION 2.1 Complete 3 courses
- MATH 112 - Calculus 1 4.0
- MATH 113 - Calculus 2 4.0
- MATH 302 - Mathematics for Engineering 1 4.0

OPTION 2.2 Complete 4 courses
- MATH 112 - Calculus 1 4.0
- MATH 113 - Calculus 2 4.0
- MATH 313 - Elementary Linear Algebra 3.0
- MATH 314 - Calculus of Several Variables 3.0

REQUIREMENT 3
Complete 1 course

MATH 303 - Mathematics for Engineering 2 4.0
MATH 334 - Ordinary Differential Equations 3.0

REQUIREMENT 4
Complete 1 course

PHYSICS 310 - Physics By Inquiry: Mechanics 3.0
PHYSICS 311 - Physics By Inquiry: Electricity 3.0

REQUIREMENT 5
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 5.1 Complete up to 3.0 hours from the following course(s)

COMPLETE UP TO 3.0 HOURS FROM THE FOLLOWING. COURSES FROM REQUIREMENT 4 CAN’T BE DOUBLE COUNTED AS ELECTIVES.

PHYSICS 313R - Special Topics in Physics 3.0
PHYSICS 318 - Introduction to Mathematical Physics 3.0
PHYSICS 321 - Mechanics 3.0
PHYSICS 329 - Observational Astronomy 3.0
PHYSICS 330 - Computational Physics Lab 1 1.0
PHYSICS 336 - Statistical and Thermal Physics 3.0
PHYSICS 391R - Seminar in Current Physics 1.0
PHYSICS 416 - Writing in Physics 3.0
PHYSICS 427 - Introduction to Astrophysics 3.0
PHYSICS 428 - Introduction to Astrophysics 3.0
PHYSICS 430 - Computational Physics Lab 3 1.0
PHYSICS 441 - Electrodynamics and Magnetism 3.0
PHYSICS 442 - Electrodynamics 3.0
PHYSICS 451 - Quantum Mechanics 3.0
PHYSICS 452 - Applications of Quantum Mechanics 3.0
PHYSICS 461 - Introduction to Acoustics 3.0
PHYSICS 471 - Principles of Optics 3.0
PHYSICS 477R - Secondary Minor Student Teaching 4.0
PHYSICS 492R - Capstone Project in Applied Physics 2.0
PHYSICS 497R - Research in Physics 3.0
PHYSICS 498R - Senior Thesis 3.0
PHYSICS 540 - Electrical Engineering Principles and Practices for Physic 2.0
PHYSICS 561 - (Physics-Me En) Fundamentals of Acoustics 3.0
PHYSICS 571 - Lasers and Atoms 3.0
PHYSICS 581 - Solid-State Physics 3.0
PHYSICS 583 - Physics of Nanostructures, Surfaces, and Interfaces 3.0

PHYSICS 585 - Thin-Film Physics 3.0
PHYSICS 586 - Transmission Electron Microscopy for Physical Science 3.0
PHYSICS 587 - Physics of Semiconductor Devices 3.0
PHYSICS 588 - Scanning Electron Microscopy (SEM) for Physical Science 3.0
PHYSICS 599R - Academic Internship 9.0v

REQUIREMENT 6 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 6.1 Complete 9 courses

CPSE 402 - Educating Students with Disabilities in Secondary Classro 2.0
IP&T 371 - Integrating K-12 Educational Technology 1 1.0
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 Elementary Education 2.0
SC ED 375 - Adolescent Development and Classroom Management 3.0

Note: FBI fingerprint and background clearance must be completed prior to enrollment in Phys 5 276.

OPTION 6.2 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 (PIS, 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 examples, 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 experience can provide excellent preparation for employment of 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 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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physics_office@byu.edu

ADVICEMENT CENTER INFORMATION
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