BS in Physics Education (694828) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2019-2020 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 the Education Advisement Center, 350 MCKB, (801) 422-3426.

<table>
<thead>
<tr>
<th>University Core Requirements:</th>
<th>Suggested Sequence of Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University Core Requirements:</strong></td>
<td><strong>JUNIOR YEAR</strong></td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td><strong>1st Semester</strong></td>
</tr>
<tr>
<td>#Classes</td>
<td>Hours</td>
</tr>
<tr>
<td><strong>Religion Cornerstones</strong></td>
<td></td>
</tr>
<tr>
<td>Teachings and Doctrine of The Book of Mormon</td>
<td>1</td>
</tr>
<tr>
<td>Jesus Christ and the Everlasting Gospel</td>
<td>1</td>
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<tr>
<td>Foundations of the Restoration</td>
<td>1</td>
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<td>The Eternal Family</td>
<td>1</td>
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<td><strong>The Individual and Society</strong></td>
<td></td>
</tr>
<tr>
<td>American Heritage</td>
<td>1-2</td>
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<tr>
<td>Global and Cultural Awareness</td>
<td>1</td>
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<tr>
<td><strong>Skills</strong></td>
<td></td>
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<tr>
<td>First Year Writing</td>
<td>1</td>
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<tr>
<td>Advanced Written and Oral Communications</td>
<td>1</td>
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<td>Quantitative Reasoning</td>
<td>1</td>
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<td>Languages of Learning (Math or Language)</td>
<td>1</td>
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<tr>
<td><strong>Arts, Letters, and Sciences</strong></td>
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<tr>
<td>Civilization 1</td>
<td>1</td>
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<tr>
<td>Civilization 2</td>
<td>1</td>
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<tr>
<td>Arts</td>
<td>1</td>
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<td>Letters</td>
<td>1</td>
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<tr>
<td>Biological Science</td>
<td>1</td>
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<tr>
<td>Physical Science</td>
<td>1</td>
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<tr>
<td>Social Science</td>
<td>1</td>
</tr>
<tr>
<td><strong>Core Enrichment: Electives</strong></td>
<td></td>
</tr>
<tr>
<td>Religion Electives</td>
<td>3-4</td>
</tr>
<tr>
<td>Open Electives</td>
<td>Variable</td>
</tr>
<tr>
<td>*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)</td>
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</tbody>
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| **Graduation Requirements:** | | |
| Minimum residence hours required | 30.0 | |
| Minimum hours needed to graduate | 120.0 | |

**FRESHMAN YEAR**

1st Semester:
- PHSCS 121 (FWSp) 3.0
- PHSCS 191 (F) 0.5
- MATH 112 (FWSpSu) 4.0
- First-Year Writing 3.0
- Arts 3.0
- Religion Cornerstone course 2.0
- **Total Hours 15.0**

2nd Semester:
- PHSCS 123 (FWSp) 3.0
- MATH 113 (FWSpSu) 4.0
- American Heritage 3.0
- Biological Science 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
- MATH 302 (FW)** 4.0
- PHY S 276 (FW) 4.0
- Religion Cornerstone course 2.0
- **Total Hours 15.0**

4th Semester:
- PHSCS 222 (FW) 3.0
- PHSCS 240 (FW) 2.0
- MATH 303 (FW) 4.0
- IP&T 371 1.0
- IP&T 372 1.0
- Social Science 3.0
- Religion Cornerstone course 2.0
- **Total Hours 16.0**

5th Semester:
- IP&T 373 (FWSp) 3.0
- MATH 302 (FW) 3.0
- ENGL 316 3.0
- PHYS 376 (FW) 3.0
- CPSE 402 2.0
- Letters 3.0
- Religion Elective 2.0
- **Total Hours 17.0**

6th Semester:
- SC ED 353 (FWSpSu) 3.0
- SC ED 375 (FWSp) 3.0
- PHYS 310 or 311 3.0
- Physics Elective 2 3.0
- Civilization 2 3.0
- Religion Elective 2.0
- **Total Hours 17.0**

**SENIOR YEAR**

7th Semester:
- PHSCS 220 (FWSp) 3.0
- Physics Elective 3 3.0
- PHYS S 377 (FW) 3.0
- PHYS S 378 (FW) 1.0
- CPSE 402 2.0
- Letters 3.0
- Religion Elective 2.0
- General Elective 1.0
- **Total Hours 15.0**

8th Semester:
- PHYS S 476R or 496R (FW) 12.0
- **Total Hours 12.0**

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.
### 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) **COMPLETE UP TO 3.0 HOURS FROM THE FOLLOWING. COURSES FROM REQUIREMENT 3 CAN'T BE DOUBLE COUNTED AS ELECTIVES.**

*PHLC 423R - History and Philosophy of Science 3.0
PHCS 167 - Descriptive Acoustics of Music and Speech 3.0
PHCS 310 - Physics By Inquiry: Mechanics 3.0
PHCS 311L - Physics By Inquiry: Electricity 3.0
PHCS 313R - Special Topics in Physics 3.0

**OPTION 4.2** Complete up to 9.0 hours from the following course(s) **COMPLETE AT LEAST 6 HOURS FROM 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 1 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 - Stellar Astrophysics 3.0
PHCS 428 - Galaxies and Cosmology 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 461L - (Phscs-Me En) 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 560 - Acoustical Measurement Methods 3.0v

### PHYSICS ELECTIVES: COMPLETE AN ADDITIONAL 9 HOURS FROM THE FOLLOWING (ANY PHYSICS COURSE ALREADY TAKEN WILL NOT DOUBLE COUNT).

PHCS 561 - (Phscs-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
PHCS 586 - Transmission Electron Microscopy for Physical Science 3.0
PHCS 587 - Physics of Semiconductor Devices 3.0
PHCS 588 - Scanning Electron Microscopy (SEM) for Physical Science 3.0
PHCS 599R - Academic Internship 9.0v

### REQUIREMENT 5 Complete 2 options

#### PROFESSIONAL EDUCATION COMPONENT:

Licensure requirements: Contact the Education Admixture Center, 350 MCKB, 801-422-3426, 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 Classrooc 2.0
IP&T 371 - Integrating K-12 Educational Technology 1.0
IP&T 372 - Integrating K-12 Educational Technology 2 1.0
IP&T 373 - Teaching in K-12 Online and Blended Learning Contex 1.0
PHYS 276 - Exploration of Teaching 4.0
PHYS 377 - Teaching Methods and Instruction 3.0
PHYS 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 Phys 5 276.

**OPTION 5.2** Complete 12.0 hours from the following course(s)

PHYS 476 - Secondary Student Teaching 12.0v
PHYS 496 - Academic Internship: Secondary Education 12.0v

Student teachers/interns must complete three forms in their Educator accounts (PIBS, CDS, FED) and attach their TWS to the Educator 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**

Department of Physics and Astronomy
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N-283 ESC
Provo, UT 84602
Telephone: (801) 422-4361
physics_office@byu.edu

**ADVICEMENT CENTER INFORMATION**

Physical and Mathematical Sciences College Advisement Center
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Telephone: (801) 422-2674

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2019-2020