

# 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  | Suggested Sequence of Courses |              |
|--|-------------------------------|--------------|
| <b>University Core Requirements:</b>   |                               |              |
| <b>Requirements</b>  | <b>#Classes</b>               | <b>Hours</b> |
| <b>Religion Cornerstones</b>   | <b>Classes</b>                |              |
| Teachings and Doctrine of The Book of Mormon   | 1                             | 2.0          |
| Jesus Christ and the Everlasting Gospel  | 1                             | 2.0          |
| Foundations of the Restoration   | 1                             | 2.0          |
| The Eternal Family   | 1                             | 2.0          |
| <b>The Individual and Society</b>  |                               |              |
| American Heritage  | 1-2                           | 3-6.0        |
| Global and Cultural Awareness  | 1                             | 2.0          |
| <b>Skills</b>  |                               |              |
| First Year Writing   | 1                             | 3.0          |
| Advanced Written and Oral Communications   | 1                             | 3.0          |
| Quantitative Reasoning   | 1                             | 4.0          |
| Languages of Learning (Math or Language)   | 1                             | 4.0          |
| <b>Arts, Letters, and Sciences</b>   |                               |              |
| Civilization 1   | 1                             | 3.0          |
| Civilization 2   | 1                             | 3.0          |
| Arts   | 1                             | 3.0          |
| Letters  | 1                             | 3.0          |
| Biological Science   | 1                             | 3-4.0        |
| Physical Science   | 1                             | 3.0          |
| Social Science   | 1                             | 3.0          |
| <b>Core Enrichment: Electives</b>  |                               |              |
| Religion Electives   | 3-4                           | 6.0          |
| Open Electives   | Variable                      | Variable     |
| *THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)   |                               |              |
| <b>Graduation Requirements:</b>  |                               |              |
| Minimum residence hours required   |                               | 30.0         |
| Minimum hours needed to graduate   |                               | 120.0        |
| <b>FRESHMAN YEAR</b>   |                               |              |
| <u>1st Semester</u>  |                               |              |
| 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          |
| <b>Total Hours</b>   |                               | <b>14.0</b>  |
| <u>2nd Semester</u>  |                               |              |
| 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          |
| <b>Total Hours</b>   |                               | <b>16.0</b>  |
| <b>SOPHOMORE YEAR</b>  |                               |              |
| <u>3rd Semester</u>  |                               |              |
| MATH 302 (FW)  |                               | 4.0          |
| PHY S 276 (FW)   |                               | 4.0          |
| PHSCS 145 (FSu)  |                               | 1.0          |
| PHSCS 220 (FWSu)   |                               | 3.0          |
| Religion Cornerstone course  |                               | 2.0          |
| <b>Total Hours</b>   |                               | <b>14.0</b>  |
| <u>4th Semester</u>  |                               |              |
| MATH 303(FW)   |                               | 4.0          |
| PHSCS 222 (FW)   |                               | 3.0          |
| PHSCS 240 (FW)   |                               | 2.0          |
| Social Science   |                               | 3.0          |
| Religion Cornerstone course  |                               | 2.0          |
| IP & T 371   |                               | 1.0          |
| IP & T 372   |                               | 1.0          |
| <b>Total Hours</b>   |                               | <b>16.0</b>  |
| <b>JUNIOR YEAR</b>   |                               |              |
| <u>5th Semester</u>  |                               |              |
| Physics Elective 1   |                               | 3.0          |
| IP&T 286 (FWSpSu)  |                               | 1.0          |
| PHSCS 127 (FWSpSu)   |                               | 3.0          |
| Civilization 1   |                               | 3.0          |
| ENGL 316   |                               | 3.0          |
| Religion Elective  |                               | 2.0          |
| IP & T 373   |                               | 1.0          |
| <b>Total Hours</b>   |                               | <b>16.0</b>  |
| <u>6th Semester</u>  |                               |              |
| SC ED 353 (FWSpSu)   |                               | 2.0          |
| SC ED 375 (FWSp)   |                               | 3.0          |
| PHSCS 310 or 311   |                               | 3.0          |
| Physics Elective 2   |                               | 3.0          |
| Civilization 2 (and Arts)  |                               | 3.0          |
| Religion Elective  |                               | 2.0          |
| <b>Total Hours</b>   |                               | <b>16.0</b>  |
| <b>SENIOR YEAR</b>   |                               |              |
| <u>7th Semester</u>  |                               |              |
| Physics Elective 3   |                               | 3.0          |
| CPSE 402   |                               | 2.0          |
| PHY S 378 (FWSpSu)   |                               | 1.0          |
| PHY S 377 (FW)   |                               | 3.0          |
| Letters  |                               | 3.0          |
| Religion Elective  |                               | 2.0          |
| General Elective   |                               | 2.0          |
| <b>Total Hours</b>   |                               | <b>16.0</b>  |
| <u>8th Semester</u>  |                               |              |
| PHY S 476R or 496R (FW)  |                               | 12.0         |
| <b>Total Hours</b>   |                               | <b>12.0</b>  |
| 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. |                               |              |

## BS in Physics Teaching (694828)

### 2017-2018 Program Requirements (76.5 - 79.5 Credit Hours)

*For students accepted into the major after August 1, 2014, grades below C in any required coursework in a teaching major or teaching minor will not be accepted. Teacher candidates must maintain a total GPA of 3.0 or higher throughout the program and to qualify for student teaching. For details on admission and retention requirements for teaching majors and teaching minors, see Educator Preparation Program (EPP) Requirements.*

*Contact Education Student Services for entrance requirements into the licensure program.*

*A teaching minor is not required for licensure. However, it is strongly recommended.*

**REQUIREMENT 1** Complete 9 courses

**NOTE: PHSCS 191 SHOULD BE TAKEN THE FIRST SEMESTER.**

|  |     |
|--|-----|
| PHSCS 121 - Introduction to Newtonian Mechanics                  | 3.0 |
| PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics    | 3.0 |
| PHSCS 127 - Descriptive Astronomy                                | 3.0 |
| PHSCS 140 - Electronics Lab                                      | 1.0 |
| PHSCS 145 - Experimental Methods in Physics                      | 1.0 |
| PHSCS 191 - Introduction to Physics Careers and Research 1       | 0.5 |
| PHSCS 220 - Introduction to Electricity and Magnetism            | 3.0 |
| *PHSCS 222 - Modern Physics                                      | 3.0 |
| PHSCS 240 - 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

|   |     |
|---|-----|
| PHSCS 310 - Physics By Inquiry: Mechanics   | 3.0 |
| PHSCS 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.**

|   |      |
|---|------|
| *PHIL 423R - History and Philosophy of Science            | 3.0  |
| PHSCS 137 - Energy, Ecology, Weather, and the Environment | 3.0  |
| PHSCS 167 - Descriptive Acoustics of Music and Speech     | 3.0  |
| PHSCS 310 - Physics By Inquiry: Mechanics                 | 3.0  |
| PHSCS 311 - Physics By Inquiry: Electricity               | 3.0  |
| PHSCS 313R - Special Topics in Physics                    | 3.0v |

**OPTION 5.2** 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 (PHSCS 321, 461, AND 471 ARE HIGHLY RECOMMENDED).**

|  |      |
|--|------|
| PHSCS 313R - Special Topics in Physics                                 | 3.0v |
| PHSCS 318 - Introduction to Mathematical Physics                       | 3.0  |
| PHSCS 321 - Mechanics  | 3.0  |
| PHSCS 329 - Observational Astronomy                                    | 3.0  |
| PHSCS 330 - Computational Physics Lab 2                                | 1.0  |
| PHSCS 360 - Statistical and Thermal Physics                            | 3.0  |
| PHSCS 391R - Seminar in Current Physics                                | 1.0  |
| PHSCS 416 - Writing in Physics   | 3.0  |
| PHSCS 427 - Introduction to Astrophysics                               | 3.0  |
| PHSCS 428 - Introduction to Astrophysics                               | 3.0  |
| PHSCS 430 - Computational Physics Lab 3                                | 1.0  |
| PHSCS 441 - Electrostatics and Magnetism                               | 3.0  |
| PHSCS 442 - Electrodynamics  | 3.0  |
| PHSCS 451 - Quantum Mechanics  | 3.0  |
| PHSCS 452 - Applications of Quantum Mechanics                          | 3.0  |
| PHSCS 461 - Introduction to Acoustics                                  | 3.0  |
| PHSCS 471 - Principles of Optics                                       | 3.0  |
| PHSCS 477R - Secondary Minor Student Teaching                          | 4.0  |
| PHSCS 492R - Capstone Project in Applied Physics                       | 2.0  |
| PHSCS 497R - Research in Physics                                       | 3.0v |
| PHSCS 498R - Senior Thesis   | 3.0v |
| PHSCS 500 - (Phscs-Chem-C S-Geol-Math-MthEd-Stat) Business Career      | 1.5  |
| PHSCS 540 - Electrical Engineering Principles and Practices for Physic | 2.0  |
| PHSCS 561 - (Phscs-Me En) Fundamentals of Acoustics                    | 3.0  |
| PHSCS 571 - Lasers and Atoms   | 3.0  |
| PHSCS 581 - Solid-State Physics  | 3.0  |
| PHSCS 583 - Physics of Nanostructures, Surfaces, and Interfaces        | 3.0  |

|   |      |
|---|------|
| PHSCS 585 - Thin-Film Physics                                       | 3.0  |
| PHSCS 586 - Transmission Electron Microscopy for Physical Science a | 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 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 Classroc | 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 Secondary 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 Phy S 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 (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 examples, physicists invented the first lasers and semiconductor electronic devices.

## BS in Physics Teaching (694828)

2017-2018

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](http://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

Brigham Young University  
N-283 ESC  
Provo, UT 84602  
Telephone: (801) 422-4361  
[physics\\_office@byu.edu](mailto:physics_office@byu.edu)

### ADVISEMENT CENTER INFORMATION

#### Physical and Mathematical Sciences College Advisement Center

Brigham Young University  
N-181 ESC  
Provo, UT 84602  
Telephone: (801) 422-2674