

BS in Physics Education (694828) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2022-2023 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.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:							
Requirements	#Classes	Hours	Classes				
Religion Cornerstones				FRESHMAN YEAR			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	1st Semester			
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	PHSCS 121 (FWSp)	3.0		
Foundations of the Restoration	1	2.0	REL C 225	PHSCS 191 (F)	0.5		
The Eternal Family	1	2.0	REL C 200	MATH 112 (FWSpSu)	4.0		
The Individual and Society				First-year Writing	3.0		
American Heritage	1-2	3-6.0	from approved list	Arts	3.0		
Global and Cultural Awareness	1	3.0	SC ED 353*	Religion Cornerstone course	2.0		
Skills				Total Hours	15.5		
First Year Writing	1	3.0	from approved list	JUNIOR YEAR			
Advanced Written and Oral Communications	1	3.0	PHSCS 416 or WRTG 316	5th Semester			
Quantitative Reasoning	1	4.0	MATH 112*	PHSCS 127 (FWSp)	3.0		
Languages of Learning (Math or Language)	1	4.0	MATH 112*	Physics Elective 1	3.0		
Arts, Letters, and Sciences				American Heritage	3.0		
Civilization 1	1	3.0	from approved list	IP&T 373 (FWSp)	1.0		
Civilization 2	1	3.0	from approved list	WRTG 316	3.0		
Arts	1	3.0	from approved list	Civilization 1	3.0		
Letters	1	3.0	PHIL 423*	Religion Elective	2.0		
Biological Science	1	3-4.0	from approved list	Total Hours	15.0		
Physical Science	1	3.0	PHSCS 222*	6th Semester			
Social Science	1	3.0	from approved list	SC ED 353 (FWSpSu)	3.0		
Core Enrichment: Electives				SC ED 375 (FWSp)	3.0		
Religion Electives	3-4	6.0	from approved list	PHSCS 310 or 311	3.0		
Open Electives	Variable	Variable	personal choice	Physics Elective 2	3.0		
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (13 hours overlap)				Religion Cornerstone course	2.0		
				Total Hours	17.0		
Graduation Requirements:				SENIOR YEAR			
Minimum residence hours required		30.0		7th Semester			
Minimum hours needed to graduate		120.0		Physics Elective 3	3.0		
				MATH 302 (FW)**	4.0		
				PHY S 276 (FW)	4.0		
				Religion Cornerstone course	2.0		
				Total Hours	15.0		
				*It's highly recommended to take PHSCS 220 and PHSCS 225 at the same time.			
				**The Math 213/215/314/334 (9 cr) sequence can be taken in place of the MATH 302/303 (8 cr) sequence.			
				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		
				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.			
				8th Semester			
				PHY S 476R or 496R (FW)	12.0		
				Total Hours	12.0		

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2022-2023 Program Requirements (78.5 - 79.5 Credit Hours)

<p><i>Licensure: This program meets the educational requirements designed to lead to an occupationally required professional license or certificate in the state of Utah. Students pursuing occupations requiring a license or certificate in a state other than Utah should contact the appropriate BYU academic advisement center as well as the licensing agency in the state where they intend to work to seek information and guidance regarding licensure and certification requirements.</i></p> <p><i>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 https://www.schools.utah.gov/curr/licensing or contact the Education Advisement Center, 350 MCKB, 801-422-3426.</i></p> <p><i>For students accepted into the major after December 16, 2019, grades below C in any required coursework in a teaching major or teaching minor will not be accepted. Teacher candidates must maintain a cumulative GPA of 2.7 or higher once admitted into the program and to qualify for student teaching. For additional details on admission and retention requirements for teaching majors and teaching minors, see Educator Preparation Program Requirements in the Undergraduate Catalog.</i></p> <p><i>A teaching minor is not required for licensure. However, it is strongly recommended.</i></p> <p>REQUIREMENT 1 Complete 10 courses</p> <p>NOTE: PHSCS 191 SHOULD BE TAKEN THE FIRST SEMESTER.</p> <p>*MATH 112 - Calculus 1 4.0</p> <p>MATH 113 - Calculus 2 4.0</p> <p>PHSCS 121 - Introduction to Newtonian Mechanics 3.0</p> <p>PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics 3.0</p> <p>PHSCS 127 - Descriptive Astronomy 3.0</p> <p>PHSCS 191 - Introduction to Physics Careers and Research 1 0.5</p> <p>PHSCS 220 - Introduction to Electricity and Magnetism 3.0</p> <p>*PHSCS 222 - Modern Physics 3.0</p> <p>PHSCS 225 - Introduction to Experimental Physics 2.0</p> <p>PHSCS 240 - Design, Fabrication, and Use of Scientific Apparatus 2.0</p> <p>REQUIREMENT 2 Complete 1 option</p> <p>OPTION 2.1 Complete 2 courses</p> <p>MATH 302 - Mathematics for Engineering 1 4.0</p> <p>MATH 303 - Mathematics for Engineering 2 4.0</p> <p>OPTION 2.2 Complete 3 courses</p> <p>MATH 313 - (Not currently offered)</p> <p>MATH 314 - Calculus of Several Variables 3.0</p>	<p>MATH 334 - Ordinary Differential Equations 3.0</p> <p>OPTION 2.3 Complete 4 courses</p> <p>MATH 213 - Elementary Linear Algebra 2.0</p> <p>MATH 215 - Computational Linear Algebra 1.0</p> <p>MATH 314 - Calculus of Several Variables 3.0</p> <p>MATH 334 - Ordinary Differential Equations 3.0</p> <p>REQUIREMENT 3 Complete 1 course</p> <p>PHSCS 310 - Physics By Inquiry: Mechanics 3.0</p> <p>PHSCS 311 - Physics By Inquiry: Electricity 3.0</p> <p>REQUIREMENT 4 Complete 9.0 hours from the following option(s)</p> <p>PHYSICS ELECTIVES: COMPLETE AN ADDITIONAL 9 HOURS FROM THE FOLLOWING (ANY PHYSICS COURSE ALREADY TAKEN WILL NOT DOUBLE COUNT).</p> <p>OPTION 4.1 Complete up to 3.0 hours from the following course(s)</p> <p>COMPLETE UP TO 3.0 HOURS FROM THE FOLLOWING. COURSES FROM REQUIREMENT 3 CAN'T BE DOUBLE COUNTED AS ELECTIVES.</p> <p>*PHIL 423R - History and Philosophy of Science 3.0</p> <p>PHSCS 137 - Energy, Climate, and the Environment 3.0</p> <p>PHSCS 167 - Descriptive Acoustics of Music and Speech 3.0</p> <p>PHSCS 310 - Physics By Inquiry: Mechanics 3.0</p> <p>PHSCS 311 - Physics By Inquiry: Electricity 3.0</p> <p>PHSCS 313R - Special Topics in Physics 3.0v</p> <p>OPTION 4.2 Complete up to 9.0 hours from the following course(s)</p> <p>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).</p> <p>PHSCS 313R - Special Topics in Physics 3.0v</p> <p>PHSCS 318 - Introduction to Mathematical Physics 3.0</p> <p>PHSCS 321 - Mechanics 3.0</p> <p>PHSCS 329 - Observational Astronomy 3.0</p> <p>PHSCS 330 - Computational Physics Lab 2 1.0</p> <p>PHSCS 360 - Statistical and Thermal Physics 3.0</p> <p>PHSCS 391R - Seminar in Current Physics 1.0</p> <p>PHSCS 416 - Writing in Physics 3.0</p> <p>PHSCS 427 - Stellar Astrophysics 3.0</p> <p>PHSCS 428 - Galaxies and Cosmology 3.0</p> <p>PHSCS 430 - Computational Physics Lab 3 1.0</p> <p>PHSCS 441 - Electricity and Magnetism 3.0</p> <p>PHSCS 442 - Electrodynamics 3.0</p> <p>PHSCS 451 - Quantum Mechanics 3.0</p> <p>PHSCS 452 - Applications of Quantum Mechanics 3.0</p> <p>PHSCS 461 - (Phscs-Me En) Introduction to Acoustics 3.0</p>	<p>PHSCS 471 - Principles of Optics 3.0</p> <p>PHSCS 477R - Secondary Minor Student Teaching 4.0</p> <p>PHSCS 492R - Capstone Project in Applied Physics 2.0v</p> <p>PHSCS 497R - Research in Physics 3.0v</p> <p>PHSCS 498R - Senior Thesis 2.0v</p> <p>PHSCS 500 - (Phscs-Chem-C S-Geol-Math-MthEd-Stat) Business Career 1.5</p> <p>PHSCS 502 - Job Search Strategies 1.0</p> <p>PHSCS 540 - Electrical Engineering Principles and Practices for Physics: 2.0</p> <p>PHSCS 560 - Acoustical Measurement Methods 3.0</p> <p>PHSCS 561 - (Phscs-Me En) Fundamentals of Acoustics 3.0</p> <p>PHSCS 571 - Lasers and Atoms 3.0</p> <p>PHSCS 581 - Solid-State Physics 3.0</p> <p>PHSCS 583 - Physics of Nanostructures, Surfaces, and Interfaces 3.0</p> <p>PHSCS 585 - Thin-Film Physics 3.0</p> <p>PHSCS 586 - Transmission Electron Microscopy for Physical Science an 3.0</p> <p>PHSCS 587 - Physics of Semiconductor Devices 3.0</p> <p>PHSCS 588 - Scanning Electron Microscopy (SEM) for Physical Science: 3.0</p> <p>PHSCS 599R - Academic Internship 9.0v</p> <p>REQUIREMENT 5 Complete 2 options</p> <p>PROFESSIONAL EDUCATION COMPONENT:</p> <p><i>Licensure requirements: Contact the Education Advisement 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.</i></p> <p>OPTION 5.1 Complete 9 courses</p> <p>CPSE 402 - Educating Students with Disabilities in Secondary Classroom 2.0</p> <p>IP&T 371 - Integrating K-12 Educational Technology 1 1.0</p> <p>IP&T 372 - Integrating K-12 Educational Technology 2 1.0</p> <p>IP&T 373 - Teaching in K-12 Online and Blended Learning Contexts 1.0</p> <p>PHY S 276 - Exploration of Teaching 4.0</p> <p>PHY S 377 - Teaching Methods and Instruction 3.0</p> <p>PHY S 378 - Practicum in Secondary Education 1.0</p> <p>*SC ED 353 - Multicultural Education for Secondary Education 3.0</p> <p>SC ED 375 - Adolescent Development and Classroom Management 3.0</p> <p>Note: FBI fingerprint and background clearance must be completed prior to enrollment in Phy S 276.</p> <p>OPTION 5.2 Complete 12.0 hours from the following course(s)</p> <p>PHY S 476 - Secondary Student Teaching 12.0v</p> <p>PHY S 496 - Academic Internship: Secondary Education 12.0v</p> <p><i>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.</i></p>
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2022-2023 Program Requirements Cont...

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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