

BS in Physics (694821) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2023-2024 curricular year.



University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR			
Requirements	#Classes	Hours	Classes	1st Semester		JUNIOR YEAR	
Religion Cornerstones				5th Semester			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275	PHSCS 121 (FWSp)	3.0	PHSCS 245 (FW)	2.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	PHSCS 191 (F)	0.5	PHSCS 318 (FW)	3.0
Foundations of the Restoration	1	2.0	REL C 225	MATH 112 (FWSpSu)	4.0	PHSCS 321 (FSp)	3.0
The Eternal Family	1	2.0	REL C 200	First-year Writing	3.0	PHSCS 330 (FSp)	1.0
The Individual and Society				General Electives	2.0	Social Science	3.0
American Heritage	1-2	3-6.0	from approved list	Religion Cornerstone course	2.0	Religion Elective	2.0
Global and Cultural Awareness	1	3.0	from approved list	Total Hours	14.5	Total Hours	14.0
Skills				2nd Semester		6th Semester	
First Year Writing	1	3.0	from approved list	PHSCS 123 (FWSp)	3.0	PHSCS 360 (W)	3.0
Advanced Written and Oral Communications	1	3.0	PHSCS 416 or WRTG 316	MATH 113 (FWSpSu)	4.0	PHSCS 430 (WSu)	1.0
Quantitative Reasoning	1	4.0	MATH 113*	C S 111 (FWSp)	3.0	Arts	3.0
Languages of Learning (Math or Language)	1	4.0	MATH 113*	American Heritage	3.0	Civilization 1	3.0
Arts, Letters, and Sciences				Religion Cornerstone course	2.0	Global & Cultural Awareness	3.0
Civilization 1	1	3.0	from approved list	Total Hours	15.0	Religion Elective	2.0
Civilization 2	1	3.0	from approved list	SOPHOMORE YEAR		Total Hours	15.0
Arts	1	3.0	from approved list	3rd Semester		SENIOR YEAR	
Letters	1	3.0	from approved list	PHSCS 220 (FWSp)	3.0	7th Semester	
Biological Science	1	3-4.0	from approved list	PHSCS 225 (FW)*	2.0	PHSCS 441 (FSp)	3.0
Physical Science	1	3.0	PHSCS 222*	PHSCS 230 (FW)	1.0	PHSCS 451 (F)	3.0
Social Science	1	3.0	from approved list	PHSCS 291 (F)	0.5	Letters	3.0
Core Enrichment: Electives				MATH 302 (FW)**	4.0	Civilization 2	3.0
Religion Electives	3-4	6.0	from approved list	Biological Science	3.0	General Elective 2	2.0
Open Electives	Variable	Variable	personal choice	Religion Cornerstone course	2.0	Religion Elective	2.0
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (7 hours overlap)				Total Hours	15.5	Total Hours	16.0
Graduation Requirements:				4th Semester		8th Semester	
Minimum residence hours required		30.0		PHSCS 222 (FWSp)	3.0	PHSCS 416 (W)	3.0
Minimum hours needed to graduate		120.0		PHSCS 240 (FW)	2.0	PHSCS Requirement 2 Elective	3.0
				MATH 303 (FW)	4.0	PHSCS Requirement 2 Elective	3.0
				General Elective	3.0	PHSCS Requirement 3 Elective	3.0
				Religion Cornerstone course	2.0	PHSCS 498R (Senior Thesis credit; FWSpSu)	2.0
				Total Hours	14.0	General Elective	2.0
						Total Hours	16.0
				Note: 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.			

Program Requirements

No more than 3 hours of D credit is allowed in major courses.

Requirement 1 —Complete 19 Courses

Note: Phscs 191 should be taken the first semester as a freshman. Phscs 291 should be taken the first semester as a sophomore.

C S 111 - Intro to Computer Science 3.0

MATH 113 - Calculus 2 4.0

PHSCS 121 - Intro to Newtonian Mechanics 3.0

PHSCS 123 - Intro to Waves, Optics, Thermo 3.0

PHSCS 191 - Intro Phscs Careers & Rsrch 1 0.5

PHSCS 220 - Intro Electricity & Magnetism 3.0

PHSCS 222 - Modern Physics 3.0

PHSCS 225 - Intro to Experimental Physics 2.0

PHSCS 230 - Computational Physics Lab 1 1.0

PHSCS 240 - Dsgn, Fabricatn, Sci Apparatus 2.0

PHSCS 245 - Experiments in Contemp Phscs 2.0

PHSCS 291 - Intro Phscs Careers & Rsrch 2 0.5

PHSCS 318 - Intro Math Physics 3.0

PHSCS 321 - Mechanics 3.0

PHSCS 330 - Computational Physics Lab 2 1.0

PHSCS 360 - Statistical & Thermal Physics 3.0

PHSCS 430 - Computational Physics Lab 3 1.0

PHSCS 441 - Electricity & Magnetism 3.0

PHSCS 451 - Quantum Mechanics 3.0

Requirement 2 —Complete 2 of 3 Courses

PHSCS 442 - Electrodynamics 3.0

PHSCS 452 - Appl Quantum Mechanics 3.0

PHSCS 471 - Principles of Optics 3.0

Requirement 3 —Complete 1 of 6 Courses

PHSCS 442 - Electrodynamics 3.0

PHSCS 452 - Appl Quantum Mechanics 3.0

PHSCS 461 - Introduction to Acoustics 3.0

PHSCS 471 - Principles of Optics 3.0

PHSCS 530 - Computational Physics 3.0

PHSCS 581 - Solid State Physics 3.0

Requirement 4 —Complete 1 of 2 Options

Option 4.1 —Complete 2 Courses

MATH 302 - Math for Engr 1 4.0

MATH 303 - Math for Engineering 2 4.0

Option 4.2 —Complete 4 Courses

MATH 213 - Elementary Linear Algebra 2.0

MATH 215 - Computational Linear Algebra 1.0

MATH 314 - Calculus of Several Variables 3.0

MATH 334 - Ordinary Differential Equation 3.0

Requirement 5 —Complete 1 Requirement

Senior thesis:

Complete a senior thesis, including the following:

A. Choose a research mentor and group as early as possible, starting with information in Phscs 191 and 291, and discussion with faculty, your advisor and senior thesis coordinator. It is best to start as a freshman or sophomore. Interdisciplinary work in other departments or in internships is possible.

Requirement 5.1 —Complete 2 hours

B.

PHSCS 498R - Senior Thesis - *You may take up to 2.0 credit hours* 0.5v

Requirement 6 — Obtain confirmation from your advisement center that you have completed the following:

Students are required to take the Physics "Major Field Test" the last semester before they graduate. The test is a standardized assessment of

undergraduate physics written by ETS (Educational Testing Service). The ETS website contains a description of the exam and sample problems: <http://www.ets.org/mft/about/content/physics>. Results of the exam do not appear on the transcript or affect the GPA. Students should contact the Physics undergraduate secretary to make arrangements for taking the exam; typically it's done in the Testing Center before mid-semester.

Note 1: Students planning careers in experimental, applied, or industrial physics should complete Stat 201.

Note 2: All students will benefit, through courses or individual study, by learning programming skills and numerical methods beyond what you are taught in C S 111 and our computational physics courses. Consider the following: C S courses, Math 410, Me En 373.

Note 3: Students planning graduate school in physics should learn complex analysis. Consider the following: Math 332, Phscs 601, 602.

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.

For more information, see www.physics.byu.edu/undergraduate.

CAREER OPPORTUNITIES:

A degree in physics or physics-astronomy can provide:

1. Preparation for those who intend to enter industrial or governmental service as engineers, technicians, 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 (especially patent 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 on careers in your major, 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.

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