

BS in Applied Physics (694825) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2024-2025 curricular year

University Core and Graduation Requirements				Suggested Sequence of Courses			
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	# Classes	Hours	Classes	<u>1st Semester</u>		<u>5th Semester</u>	
Religion Cornerstones				PHSCS 121	3.00	PHSCS 245	2.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	PHSCS 191	0.50	PHSCS 318	3.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	MATH 112	4.00	PHSCS 321	3.00
Foundations of the Restoration	1	2.00	REL C 225	First Year Writing	3.00	PHSCS 330	1.00
The Eternal Family	1	2.00	REL C 200	UNIV 101	2.00	GE Arts, Letters, Sciences	3.00
				Religion Cornerstone Class	2.00	GE Religion	2.00
				Total Hours:	14.50	Total Hours:	14.00
BYU Foundations for Student Success				<u>2nd Semester</u>		<u>6th Semester</u>	
Foundations for Student Success	1	2.00	UNIV 101	PHSCS 123	3.00	PHSCS 430	1.00
The Individual and Society				MATH 113	4.00	Applied Physics Elective 1	3.00
American Heritage	1 to 2	3.00-6.00	from approved list	CS 111	3.00	Applied Physics Elective 2	3.00
Global and Cultural Awareness	1	3.00	from approved list	American Heritage	3.00	GE Arts, Letters, Sciences	3.00
				Religion Cornerstone Class	2.00	Global and Cultrural Awareness	3.00
				Total Hours:	15.00	Total Hours:	15.00
Skills				SOPHMORE YEAR			
First Year Writing	1	3.00	from approved list	<u>3rd Semester</u>		<u>7th Semester</u>	
Advanced Written and Oral Communications	1	3.00	PHSCS 416 or WRTG 316	PHSCS 220	3.00	PHSCS 441	3.00
Quantitative Reasoning	1	4.00	MATH 112*	PHSCS 225	2.00	Applied Physics Elective 3	3.00
Languages of Learning (Math of Language)	1	4.00	MATH 112*	PHSCS 230	1.00	GE Arts, Letters, Sciences	3.00
Arts, Letters and Sciences (Complete 6 of 7)				PHSCS 291	0.50	Open Elective	3.00
Civilization 1	1	3.00	from approved list	MATH 302	3.00	Open Elective	3.00
Civilization 2	1	3.00	from approved list	GE Arts, Letters, Sciences	3.00	GE Religion	2.00
Arts	1	3.00	from approved list	Religion Cornerstone Class	2.00	Total Hours:	17.00
Letters	1	3.00	from approved list	Total Hours:	14.50	<u>8th Semester</u>	
Biological Science	1	3.00-4.00	from approved list	PHSCS 222	3.00	PHSCS 416 or WRTG 316	3.00
Physical Science	2	3.00	PHSCS 222*	PHSCS 240	2.00	PHSCS 442, PHSCS 471, or EC EN 466	3.00
Social Science	1	3.00	from approved list	MATH 303	4.00	Applied Physics Elective 4	3.00
Core Enrichment: Electives				GE Arts, Letters, Sciences	3.00	PHSCS 492R or 498R	3.00
Religion Electives	3 to 4	6.00	from approved list	Religion Cornerstone Class	2.00	General Elective	2.00
Open Electives	Variable	Variable	personal choice	Total Hours:	14.00	General Elective	2.00
Graduation Requirements:						Total Hours:	16.00
Minimum residence hours required		30.00					
Minimum hours needed to graduate		120.00					
*These classes fill both university core and program requirements							

Program Requirements

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

Consult with a faculty advisor as early as possible to choose electives.

Requirement 1 — Complete 17 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 430 - Computational Physics Lab 3 1.0

PHSCS 441 - Electricity & Magnetism 3.0

Requirement 2 — Complete 1 of 3 Courses

Note: Although Ec En 466 has some Ec En classes listed as prerequisites, they are often waived for Applied Physics majors. Specifically, Ec En 466 can be taken with no other prereqs as long as the student has taken Phscs 441. However, it is still recommended for students who have taken Phscs 441 to also take Phscs 442 or Ec En 462 prior to taking Ec En 466. Interested students should talk to the Ec En 466 instructor about their specific backgrounds.

EC EN 466 - Intro to Optical Engineering 2.0

PHSCS 442 - Electrodynamics 3.0

PHSCS 471 - Principles of Optics 3.0

Requirement 3 — Obtain confirmation from your advisement center that you have completed the following:

After gaining department advisor's approval of courses selected to define an option, complete an additional 12 hours of electives (cannot include any courses already taken above). These 12 hours must consist of a coherent set of upper-division courses with an identified educational goal. Nine hours must be upper division (300-level or above); three hours must be 200-level or above.

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 2 hours

Complete a capstone project or 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 discussions with faculty, your advisor, and the capstone project coordinator or senior thesis coordinator. It is best to start as a freshman or sophomore. Interdisciplinary work in other departments or in internships is possible.

Option 5.1 — Complete up to 2 hours

B. Complete 2 hours of one of the following:

PHSCS 492R - Capstone in Applied Phscs - You may take up to 2.0 credit hours 2.0

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: CS courses, Math 410, Me En 373.

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.

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 students 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.

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

FACULTY ADVISORS ASSIGNED BY LAST TWO DIGITS OF BYU ID NUMBER.
CONTACT:

Department of Physics and Astronomy

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ADVISEMENT CENTER INFORMATION

Computational, Mathematical and Physical Sciences College

Advisement Center

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