

BS in Physics and Astronomy (694832) 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	MATH 303	4.00
Teachings and Doctrines of the Book of Mormon	1	2.00	REL A 275	UNIV 101	2.00	PHSCS 321	3.00
Jesus Christ and the Everlasting Gospel	1	2.00	REL A 250	PHSCS 191	0.50	PHSCS 330	1.00
Foundations of the Restoration	1	2.00	REL C 225	MATH 112	4.00	GE Arts, Letters, Sciences	3.00
The Eternal Family	1	2.00	REL C 200	First Year Writing	3.00	GE Arts, Letters, Sciences	3.00
BYU Foundations for Student Success				Religion Cornerstone Class	2.00	GE Religion	2.00
Foundations for Student Success	1	2.00	UNIV 101	Total Hours:	14.50	Total Hours:	16.00
The Individual and Society				<u>2nd Semester</u>		<u>6th Semester</u>	
American Heritage	1 to 2	3.00-6.00	from approved list	PHSCS 123	3.00	PHSCS 329	3.00
Global and Cultural Awareness	1	3.00	from approved list	MATH 113	4.00	Physics Requirement 2	3.00
Skills				PHSCS 127	3.00	Open Elective	1.00
First Year Writing	1	3.00	from approved list	American Heritage	3.00	GE Arts, Letters, Sciences	3.00
Advanced Written and Oral Communications	1	3.00	PHSCS 416 or WRTG 316	Religion Cornerstone Class	2.00	PHSCS 318	3.00
Quantitative Reasoning	1	4.00	MATH 113*	Total Hours:	15.00	GE Religion	2.00
Languages of Learning (Math of Language)	1	4.00	MATH 113*	SOPHMORE YEAR		Total Hours:	15.00
Arts, Letters and Sciences (Complete 6 of 7)				<u>3rd Semester</u>		SENIOR YEAR	
Civilization 1	1	3.00	from approved list	PHSCS 220	3.00	<u>7th Semester</u>	
Civilization 2	1	3.00	from approved list	PHSCS 227	3.00	PHSCS 427	3.00
Arts	1	3.00	from approved list	PHSCS 230	1.00	PHSCS 441	3.00
Letters	1	3.00	from approved list	PHSCS 291	0.50	PHSCS 451	3.00
Biological Science	1	3.00-4.00	from approved list	CS 111	3.00	GE Arts, Letters, Sciences	3.00
Physical Science	2	3.00	PHSCS 222*	General Electives	2.00	GE Religion	2.00
Social Science	1	3.00	from approved list	Religion Cornerstone Class	2.00	Open Elective	1.00
Core Enrichment: Electives				Total Hours:	14.50	Total Hours:	15.00
Religion Electives	3 to 4	6.00	from approved list	<u>4th Semester</u>		<u>8th Semester</u>	
Open Electives	Variable	Variable	personal choice	PHSCS 222	3.00	PHSCS 416 or WRTG 316	3.00
Graduation Requirements:				PHSCS 228	3.00	PHSCS 428	3.00
Minimum residence hours required		30.00		MATH 302	4.00	Open Elective	1.00
Minimum hours needed to graduate		120.00		GE Arts, Letters, Sciences	3.00	Physics Requirement 2	3.00
				Religion Cornerstone Class	2.00	RHSCS 498R	2.00
				Total Hours:	15.00	Global and Cultural Awareness	3.00
						Total Hours:	15.00
*These classes fill both university core and program requirements							

Program Requirements

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

Requirement 1 —Complete 1 Requirement

Requirement 1.1 —Complete 20 Courses

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 127 - Descriptive Astronomy 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 227 - Solar System Astronomy 3.0

PHSCS 228 - Stars & Galaxies 3.0

PHSCS 230 - Computational Physics Lab 1 1.0

PHSCS 291 - Intro Phscs Careers & Rsrch 2 0.5

PHSCS 318 - Intro Math Physics 3.0

PHSCS 321 - Mechanics 3.0

PHSCS 329 - Observational Astronomy 3.0

PHSCS 330 - Computational Physics Lab 2 1.0

PHSCS 427 - Stellar Astrophysics 3.0

PHSCS 428 - Galaxies and Cosmology 3.0

PHSCS 441 - Electricity & Magnetism 3.0

PHSCS 451 - Quantum Mechanics 3.0

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

should be taken the first semester as a sophomore.

Requirement 2 —Complete 2 of 4 Courses

PHSCS 360 - Statistical & Thermal Physics 3.0

PHSCS 442 - Electrodynamics 3.0

PHSCS 452 - Appl Quantum Mechanics 3.0

PHSCS 471 - Principles of Optics 3.0

Requirement 3 —Complete 1 of 2 Options

Option 3.1 —Complete 2 Courses

MATH 302 - Math for Engr 1 4.0

MATH 303 - Math for Engineering 2 4.0

Option 3.2 —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 4 —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 192, and discussions with faculty, your advisor, and the senior thesis coordinator. It is best to start as a freshman or sophomore. Some internships may qualify for your project.

Requirement 4.1 —Complete 2 hours

B.

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

Requirement 5 — 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: Students planning on graduate school in astronomy should consider taking all four of Phscs 360, 442, 452, 471, instead of only two. Gain statistics and computer programming skills beyond what you get in this

major by taking courses such as Stat 201 (Statistics for Engineers and Scientists) and courses such as Phscs 430 (Computational Physics 3) and Me En 373 (Introduction to Scientific Computing).

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

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

Department of Physics and Astronomy
Brigham Young University
N-283 ESC
Provo, UT 84602
Telephone: (801) 422-4361

ADVISEMENT CENTER INFORMATION

**Computational, Mathematical, & Physical Sciences College Advisement
Center** Brigham Young University
N-181 ESC
Provo, UT 84602
Telephone: (801) 422-2674