BS in Physics and Astronomy (694832) 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

University Core Requirements:

Requirements	#Classes	Hours	Classes
Religion Cornerstones			
Teachings and Doctrine of The Book of Mormon	1	2.0	REL A 275
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250
Foundations of the Restoration	1	2.0	REL C 225
The Eternal Family	1	2.0	REL C 200
The Individual and Society			
American Heritage	1-2	3-6.0	from approved list
Global and Cultural Awareness	1	3.0	from approved list
Skills			
First Year Writing	1	3.0	from approved list
Advanced Written and Oral Communications	1	3.0	PHSCS 416 or WRTG 316
Quantitative Reasoning	1	4.0	MATH 113*
Languages of Learning (Math or Language)	1	4.0	MATH 113*
Arts, Letters, and Sciences			
Civilization 1	1	3.0	from approved list
Civilization 2	1	3.0	from approved list
Arts	1	3.0	from approved list
Letters	1	3.0	from approved list
Biological Science	1	3–4.0	from approved list
Physical Science	1	3.0	PHSCS 222*
Social Science	1	3.0	from approved list
Core Enrichment: Electives			
Religion Electives	3-4	6.0	from approved list
Open Electives	Variable	Variable	personal choice

*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (7 hours overlap)

Graduation Requirements:

Minimum residence hours required	30.0
Minimum hours needed to graduate	120.0

Suggested Sequence of Courses

FRESHMAN YEAR

1st Semester

PHSCS 121 (FWSp)	3.0
PHSCS 127 (FWSp)	3.0
PHSCS 191 (F)	0.5
MATH 112 (FWSpSu)	4.0
First-year Writing	3.0
Religion Cornerstone course	2.0
Total Hours	**15.5**

2nd Semester

PHSCS 123 (FWSp)	3.0
MATH 113 (FWSpSu)	4.0
C S 111	3.0
American Heritage	3.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

SOPHOMORE YEAR

3rd Semester

PHSCS 220 (FWSp)	3.0
PHSCS 227 (F)	3.0
PHSCS 230 (FW)	1.0
PHSCS 291 (F)	0.5
MATH 302 (FW)	4.0
General Electives	2.0
Religion Cornerstone course	2.0
Total Hours	**15.5**

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 228 (W)	3.0
MATH 303 (FW)	4.0
Biological Science	3.0
Religion Cornerstone course	2.0
Total Hours	**15.0**

JUNIOR YEAR

5th Semester

PHSCS 318 (FW)	3.0
PHSCS 321 (FSp)	3.0
PHSCS 330 (FSp)	1.0
Civilization 1	3.0
Social Science	3.0
Religion Elective	2.0
Total Hours	**15.0**

6th Semester

PHSCS 329 (FW)	3.0
PHSCS 360 (W) or 471 (WSu) (requirement 2)	3.0
Arts	3.0
Civilization 2	3.0
General Elective	4.0
Religion Elective	2.0
Total Hours	**18.0**

SENIOR YEAR

7th Semester

PHSCS 427 (F)	3.0
PHSCS 441 (FSp)	3.0
PHSCS 451 (F)	3.0
Letters	3.0
Religion Elective	2.0
Total Hours	**14.0**

8th Semester

PHSCS 416 (W)	3.0
PHSCS 428 (W)	3.0
PHSCS 360 (W) or 442 (W) or 452 (WSu) or 471 (FW) (requirement 2)	3.0
PHSCS 498R (Senior thesis credit; FWSpSu)	2.0
Global and Cultural Awareness	3.0
Total Hours	**14.0**

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 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

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