



# BS in PHYSICS–ASTRONOMY (694832) MAP Sheet

Department of Physics and Astronomy

For students entering the degree program during the 2016–2017 curricular year.

UNIVERSITY CORE AND GRADUATION REQUIREMENTS				PROGRAM REQUIREMENTS (67–70 total hours)		
UNIVERSITY CORE REQUIREMENTS				No more than 3 hours of D credit is allowed in major courses.		
<u>Requirements</u>	<u>#Classes</u>	<u>Hours</u>	<u>Classes</u>	<b>Complete the following:</b>		
<b>Religion Cornerstones</b>				C S 142	Introduction to Computer Programming	3.0
Teachings and Doctrine, Book of Mormon	1	2.0	Rel A 275	Phscs 121	Introduction to Newtonian Mechanics	3.0
Jesus Christ & the Everlasting Gospel	1	2.0	Rel A 250	Phscs 123	Intro to Waves, Optics, & Thermodynamics	3.0
Foundations of the Restoration	1	2.0	Rel C 225	Phscs 127	Descriptive Astronomy	3.0
The Eternal Family	1	2.0	Rel C 200	Phscs 191	Intro to Physics Careers & Research	0.5
<b>The Individual and Society</b>				Phscs 220	Intro to Electricity & Magnetism	3.0
<b>Citizenship</b>				Phscs 222*	Modern Physics	3.0
American Heritage	1–2	3–6.0	from approved list	Phscs 227	Solar System Astronomy	3.0
Global & Cultural Awareness	1	3.0	from approved list	Phscs 228	Stellar and Extragalactic Astronomy	3.0
<b>Skills</b>				Phscs 230	Computational Physics Lab 1	1.0
<b>Effective Communication</b>				Phscs 291	Intro to Physics Careers & Research 2	0.5
First-Year Writing	1	3.0	from approved list	Phscs 318	Introduction to Mathematical Physics	3.0
Adv Written & Oral Communication	1	3.0	Phscs 416 or Engl 316	Phscs 321	Mechanics	3.0
Quantitative Reasoning	1	4.0	Math 113*	Phscs 329	Observational Astronomy	3.0
Languages of Learning (Math or Language)	1	4.0	Math 113*	Phscs 330	Computational Physics Lab 2	1.0
<b>Arts, Letters, and Sciences</b>				Phscs 427	Introduction to Astrophysics	3.0
<b>Civilization 1 and 2</b>				Phscs 428	Introduction to Astrophysics	3.0
Arts	1	3.0	from approved list	Phscs 441	Electrostatics & Magnetism	3.0
Letters	1	3.0	from approved list	Phscs 451	Quantum Mechanics	3.0
<b>Scientific Principles &amp; Reasoning</b>				<b>Note:</b> Phscs 191 should be taken the first semester as a freshman. Phscs 291 should be taken the first semester as a sophomore.		
Biological Science	1–2	3–5.0	from approved list	<b>Complete two courses from the following:</b>		
Physical Science	1	3.0	Phscs 222*	Phscs 360	Statistical and Thermal Physics	3.0
Social Science	1	3.0	from approved list	Phscs 442	Electrodynamics	3.0
<b>Core Enrichment: Electives</b>				Phscs 452	Applications of Quantum Mechanics	3.0
Religion Electives	3–4	6.0	from approved list	Phscs 471	Principles of Optics	3.0
Open Electives	Variable	Variable	personal choice	<b>Note:</b> 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).		
<b>GRADUATION REQUIREMENTS:</b>				<b>Complete one of the following options:</b>		
Minimum residence hours required				<b>Either</b>		
Minimum hours needed to graduate				Math 113* Calculus 2 4.0		
				Math 302 Mathematics for Engineering 1 4.0		
				<b>Or</b>		
				Math 113* Calculus 2 4.0		
				Math 313 Elem Linear Algebra 3.0		
				Math 314 Calculus of Several Variables 3.0		
				<b>Complete one course from the following:</b>		
				Math 303 Math for Engineering 2 4.0		
				Math 334 Ordinary Differential Equations 3.0		
				<b>Complete a senior thesis, including the following:</b>		
				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 senior thesis coordinator. It is best to start as a freshman or sophomore. Some internships may qualify for your project.		
				b. Complete 2 hours of the following:		
				Phscs 498R Senior Thesis 3.0V		

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

FOR UNIVERSITY CORE OR PROGRAM QUESTIONS CONTACT THE ADVISEMENT CENTER  
 Physical and Mathematical Sciences College Advisement Center  
 N-181 ESC  
 Brigham Young University, Provo, UT 84602  
 Telephone: (801) 422-2674

FACULTY ADVISORS ASSIGNED BY LAST TWO DIGITS OF BYU ID NUMBER, CONTACT:  
 Department of Physics and Astronomy  
 N-283 ESC  
 Brigham Young University, Provo, UT 84602  
 Telephone: (801) 422-4361

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2016–2017

**Suggested Sequence of Courses:**

**FRESHMAN YEAR**

1st Semester

First-year Writing or A Htg 100	3.0 (3.0)
Math 113 (FWSpSu)	4.0
Phscs 121 (FWSp)	3.0
Phscs 127	3.0
Phscs 191 (F)	0.5
Religion Cornerstone course	2.0
<b>Total Hours</b>	<b>15.5</b>

2nd Semester

A Htg 100 or First-year Writing	3.0 (3.0)
C S 142	3.0
Math 302 (FW)	4.0
Phscs 123 (FWSp)	3.0
Religion Cornerstone course	2.0
<b>Total Hours</b>	<b>15.0</b>

**SOPHOMORE YEAR**

3rd Semester

Phscs 220 (FWSu)	3.0
Phscs 227 (F)	3.0
Phscs 230 (FW)	1.0
Phscs 291 (F)	0.5
Physical Science (Chem or Geol)	3.0
Religion Cornerstone course	2.0
General Elective	3.0
<b>Total Hours</b>	<b>15.5</b>

4th Semester

Math 303 (FW)	4.0
Phscs 222 (FW)	3.0
Phscs 228 (W)	3.0
Biological Science	3.0
Religion Cornerstone course	2.0
<b>Total Hours</b>	<b>15.0</b>

**JUNIOR YEAR**

5th Semester

Phscs 318 (FWSp)	3.0
Phscs 321 (FSp)	3.0
Phscs 330 (FSp)	1.0
Civilization 1	3.0
Social Science	3.0
Religion Elective	2.0
<b>Total Hours</b>	<b>15.0</b>

6th Semester

Phscs 329 (W)	3.0
Phscs 360 (W) or 471 (WSu)	3.0
Arts	3.0
Civilization 2	3.0
Religion Elective	2.0
General Elective	2.0
<b>Total Hours</b>	<b>16.0</b>

**SENIOR YEAR**

7th Semester

Phscs 427 (F)	3.0
Phscs 441 (F)	3.0
Phscs 451 (F)	3.0
Letters	3.0
Religion Elective	2.0
<b>Total Hours</b>	<b>14.0</b>

8th Semester

Phscs 416 (W)	3.0
Phscs 428 (W)	3.0
Phscs 442 (W) or 452 (WSu) or 471 (FW)	3.0
Phscs 498R (FWSpSu)	2.0
Global and Cultural Awareness	3.0
<b>Total Hours</b>	<b>14.0</b>

**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 examples, 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 experience can provide excellent preparation for employment of 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 [physics.byu.edu/undergraduate/careers](http://physics.byu.edu/undergraduate/careers).

**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.

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