BS in Applied Physics (694825) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2020-2021 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 112*
Languages of Learning (Math or Language)	1	4.0	MATH 112*
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 191 (F)	0.5
MATH 112 (FWSpSu)	4.0
First-year Writing	3.0
General Electives	2.0
Religion Cornerstone course	2.0
Total Hours	**14.5**

2nd Semester

PHSCS 123 (FWSp)	3.0
MATH 113 (FWSpSu)	4.0
C S 142 (FWSp)	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 225 (FW)*	2.0
PHSCS 230 (FW)	1.0
PHSCS 291 (F)	0.5
MATH 302 (FW)**	4.0
Biological Science	3.0
Religion Cornerstone course	2.0
Total Hours	**15.5**

*It's highly recommended to take PHSCS 220 and PHSCS 225 at the same time.

**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 (FWSp)	3.0
PHSCS 240 (FW)	2.0
MATH 303 (FW)	4.0
General Elective	3.0
Religion cornerstone course	2.0
Total Hours	**14.0**

JUNIOR YEAR

5th Semester

PHSCS 245 (FW)	2.0
PHSCS 318 (FW)	3.0
PHSCS 321 (FSp)	3.0
PHSCS 330 (FSp)	1.0
Social Science	3.0
Religion elective	2.0
Total Hours	**14.0**

6th Semester

PHSCS 430 (WSu)	1.0
Applied Physics Elective 1	3.0
Applied Physics Elective 2	3.0
Arts	3.0
Global & Cultural Awareness	3.0
Religion Elective	2.0
Total Hours	**15.0**

SENIOR YEAR

7th Semester

PHSCS 441 (FSp)	3.0
Applied Physics Elective 3	3.0
Civilization 1	3.0
Letters	3.0
General Elective	2.0
Religion Elective	2.0
Total Hours	**16.0**

8th Semester

PHSCS 416 (W)	3.0
PHSCS 442 (WSu) or PHSCS 471 (WSu) or EC EN 466 (F)	3.0
Applied Physics elective 4	3.0
PHSCS 492R or PHSCS 498R (Senior thesis or capstone credit; FWSpSu)	2.0
General Elective	2.0
Civilization 2	3.0
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.

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2020-2021 Program Requirements (62 - 64 Credit Hours)

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 142 - Introduction to Computer Programming	3.0
MATH 113 - Calculus 2	4.0
PHSCS 121 - Introduction to Newtonian Mechanics	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0
PHSCS 191 - Introduction to Physics Careers and Research 1	0.5
PHSCS 220 - Introduction to Electricity and Magnetism	3.0
*PHSCS 222 - Modern Physics	3.0
PHSCS 225 - Introduction to Experimental Physics	2.0
PHSCS 230 - Computational Physics Lab 1	1.0
PHSCS 240 - Design, Fabrication, and Use of Scientific Apparatus	2.0
PHSCS 245 - Experiments in Contemporary Physics	2.0
PHSCS 291 - Introduction to Physics Careers and Research 2	0.5
PHSCS 318 - Introduction to Mathematical 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 and Magnetism	3.0

REQUIREMENT 2 Complete 1 course

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 - Introduction to Optical Engineering	2.0
PHSCS 442 - Electrodynamics	3.0
PHSCS 471 - Principles of Optics	3.0

REQUIREMENT 3

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 option

OPTION 4.1 Complete 2 courses

MATH 302 - Mathematics for Engineering 1	4.0
MATH 303 - Mathematics for Engineering 2	4.0

OPTION 4.2 Complete 3 courses

MATH 313 - (Not currently offered)	
MATH 314 - Calculus of Several Variables	3.0
MATH 334 - Ordinary Differential Equations	3.0

OPTION 4.3 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 Equations	3.0

REQUIREMENT 5 Complete 2.0 hours from the following option(s)

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 2.0 hours from the following course(s)

B. COMPLETE 2 HOURS OF ONE OF THE FOLLOWING:

PHSCS 492R - Capstone Project in Applied Physics	2.0
You may take up to 2 credit hours.	
PHSCS 498R - Senior Thesis	3.0v
You may take up to 2 credit hours.	

REQUIREMENT 6

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 142 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.

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2020-2021

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:

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ADVISEMENT CENTER INFORMATION

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