BS IN PHYSICS (APPLIED PHYSICS)

Units required for Major: 75-77
Total units required for BS: 120

Program Description

Physics is the most fundamental science and underlies our understanding of nearly all areas of science and technology. In a broad sense, physics is concerned with the study of energy, space, and matter, and with the interactions between matter and the laws that govern these interactions. More specifically, physicists study mechanics, heat, light, electric and magnetic fields, gravitation, relativity, atomic and nuclear physics, and condensed matter physics.

The BS degrees are recommended for students seeking a career in the technology sector or planning to pursue a graduate degree.

Note: Students graduating with a Bachelor of Science Degree in Physics will not be subject to the University's Foreign Language Graduation Requirement. Students who change major may be subject to the University's Foreign Language Graduation Requirement.

Program Requirements

Code	Title	Units
Required Lower Division Courses (37 Units)		
CHEM 1E	General Chemistry for Engineering	4
ENGR 45	Engineering Materials	3
CSC 25	Introduction to C Programming	3
MATH 30	Calculus I [1]	4
MATH 31	Calculus II [1]	4
MATH 32	Calculus III	4
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11A	General Physics: Mechanics [1]	4
PHYS 11B	General Physics: Heat, Light, Sound, Modern Physics	4
PHYS 11C	General Physics: Electricity and Magnetism	4
Required Upper Division Courses (29-31 Units)		
PHYS 105	Mathematical Methods in Physics	3 - 4
or MATH 105A	Advanced Mathematics for Science and Engineering I	
PHYS 106	Introduction to Modern Physics	3
PHYS 110	Classical Mechanics	3
PHYS 115	Electronics and Instrumentation	4
PHYS 124	Thermodynamics and Statistical Mechanics	3
PHYS 135	Electricity And Magnetism	3
PHYS 150	Quantum Mechanics	3
PHYS 162	Scientific Computing: Basic Methods	3
PHYS 175	Advanced Physics Laboratory	2
Select one of the following (2 units minimum):		2 - 3
PHYS 116	Advanced Electronics and Instrumentation	
PHYS 163	Scientific Computing: Modeling, Simulation, and Visualization	
PHYS 191	Senior Project	
Elective Upper Division Requirements (9 Units)		
Select 9 units of upper-division coursework in Physics or Engineering courses chosen in consultation with an advisor [2]		9
Physics Colloquium Attendance		
Fulfill a minimum attendance requirement [3]		
Total Units		**75-77**

1. Course also satisfies General Education (GE)/Graduation Requirement.
2. See list below for a list of Department approved electives.
3. Majors must fulfill a minimum attendance requirement at Department Colloquia. Students should consult with the Department for details.

Notes:

- Students are required to complete 2 units for their Senior project (PHYS 191) either over one or two semesters
- Students with an interest in theoretical physics are encouraged to consider a minor in Mathematics.
- Students graduating with a BS in Physics will not be subject to the University's Foreign Language Graduation Requirement. Students who change major may be subject to the University's Foreign Language Graduation Requirement

Elective List

Code	Title	Units
PHYS 116	Advanced Electronics and Instrumentation [4]	3
PHYS 130	Acoustics	3
PHYS 136	Electrodynamics of Waves, Radiation,and Materials	3
PHYS 142	Applied Solid State Physics	3
PHYS 145	Optics	3
PHYS 151	Advanced Modern Physics	3
PHYS 156	Classical and Statistical Mechanics	3
PHYS 163	Scientific Computing: Modeling, Simulation, and Visualization [4]	3
PHYS 199	Special Problems	1 - 3
EEE 130	Electromechanical Conversion	3
EEE 135	Renewable Electrical Energy Sources and Grid Integration	3
ENGR 112	Mechanics Of Materials	3
ENGR 132	Fluid Mechanics	3
ENGR 181	Electronic Materials	3
ME 121	Solar Thermal and Energy Storage Systems	2
ME 122	Geothermal and Bioenergy Systems	2
ME 123	Wind, Hydro and Ocean Energy	3
ME 154	Alternative Energy Systems	3
MATH 104	Vector Analysis	3
MATH 105B	Advanced Mathematics for Science and Engineering II	4

4. If not used to satisfy other requirement of the degree (Example: PHYS 115 or PHYS 145 are required for the Bachelor of Science. If both are taken, one will count as an elective).

General Education Requirements [1]

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		3
Area B: Physical Universe and Its Life Forms (6 Units)		
B1 - Physical Science [2]		0
B2 - Life Forms		3
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) [2]		0
B4 - Math Concepts [2]		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements.		3
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 - Area C Course		3
C1/C2 - Area C Course - Take upper-division course to complete Area & upper division requirements.		3
Area D: The Individual and Society (9 Units)		
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements.		3
Area E: Understanding Personal Development (3 Units)		
Area E Course		3
Area F: Ethnic Studies (3 Units)		
Area F Course		3
Total Units		**42**

1. To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/). **Note:** There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).
2. Required in Major; also satisfies GE.

Graduation Requirements [1]

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (6 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement [2]		0

1. To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/). **Note:** There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).
2. If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). "C- or better required." The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html (https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html) **Note:** Students with a declared major of BS in Physics or BS in Physics (Applied Physics) are exempt from the Foreign Language Graduation Requirement.