

BA IN PHYSICS

Units required for Major: 65-67

Total unites required for BA: 120

Program Description

The BA degree is recommended for students who are interested in teaching Physics in high school or who want a liberal arts education with an emphasis in Physics. Physics majors are encouraged to take additional mathematics and to develop skills in the use of computers.

Program Requirements

Code	Title	Units
Required Lower Division Courses (37 Units)		
CHEM 1A	General Chemistry I	5
CHEM 1B	General Chemistry II	5
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 (20-22 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	3-4
	or PHYS 145 Optics	
PHYS 124	Thermodynamics and Statistical Mechanics	3
PHYS 135	Electricity And Magnetism	3
PHYS 175	Advanced Physics Laboratory	2
Elective Upper Division Requirements (8 Units)		
Select 8 units of Physics electives in consultation with a Physics advisor ²		8
Physics Colloquium Attendance		
Fulfill a minimum attendance requirement ³		
Total Units		65-67

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 their advisor (and/or Department Chair) during their mandatory advising appointments to find out the number of colloquia that are required to satisfy this requirement.

Elective List

Code	Title	Units
PHYS 115	Electronics and Instrumentation ⁴	4
PHYS 116	Advanced Electronics and Instrumentation	3
PHYS 130	Acoustics	3
PHYS 136	Electrodynamics of Waves, Radiation, and Materials	3
PHYS 145	Optics ⁴	3
PHYS 150	Quantum Mechanics	3
PHYS 151	Advanced Modern Physics	3
PHYS 156	Classical and Statistical Mechanics	3
PHYS 162	Scientific Computing: Basic Methods	3
PHYS 163	Scientific Computing: Modeling, Simulation, and Visualization	3
PHYS 195	Teaching Internship	1-2
PHYS 196 Series		
PHYS 197	Laboratory Teaching Assistant	1-2
PHYS 199	Special Problems	1-3
ASTR 150	Dark Matter and Dark Energy	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 (<https://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) (12 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement ²		6

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 (<https://catalog.csus.edu/colleges/academic-affairs/general-education/>).

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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>)

The following roadmaps are sample planning resources. Please consult your academic advisor and Academic Catalog for graduation requirements as you develop your individualized academic plan.

Physics, BA: 4-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
MATH 30	Calculus I	4
GE Area 1C - Oral Communication ²		3
GE Area 3A - Arts ²		3
GE Area 4 - Social & Behavioral Sciences ²		3

GE Area 6 - Ethnic Studies ²		3
Units		
16		
Second Semester		
MATH 31	Calculus II	4
PHYS 11A	General Physics: Mechanics	4
GE Area 1A - English Composition ²		3
GE Area 5B - Biological Science ²		3
Units		
14		
Year 2		
First Semester		
MATH 32	Calculus III	4
PHYS 11C	General Physics: Electricity and Magnetism	4
GE Area 1B - Critical Thinking ²		3
Foreign Language Semester 1 ²		4
Units		
15		
Second Semester		
ENGL 20	College Composition II	3
MATH 45	Differential Equations for Science and Engineering	3
PHYS 11B	General Physics: Heat, Light, Sound, Modern Physics	4
GE Area 3B - Humanities ²		3
Foreign Language Semester 2 ²		4
Units		
17		
Year 3		
First Semester		
PHYS 105	Mathematical Methods in Physics	3
PHYS 106	Introduction to Modern Physics	3
PHYS 115	Electronics and Instrumentation	4
GR American Institutions (US History) ²		3
Elective of Choice		3
Units		
16		
Second Semester		
PHYS 110	Classical Mechanics	3
PHYS 124	Thermodynamics and Statistical Mechanics	3
Physics Elective ³		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive ²		3
GR American Institutions (GOVT) ²		3
Units		
15		
Year 4		
First Semester		
CHEM 1A	General Chemistry I	5
Physics Elective ³		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning ²		3
Elective of Choice		3
Units		
14		
Second Semester		
CHEM 1B	General Chemistry II	5
PHYS 135	Electricity And Magnetism	3
PHYS 175	Advanced Physics Laboratory	2
Physics Elective ³		3
Upper Division GE Area 4 - Social & Behavioral Sciences ²		3
Units		
16		
Total Units		
123		

Physics, BA: 2-Year Roadmap

Course	Title	Units
Year 1		
First Semester		
PHYS 105	Mathematical Methods in Physics	3
PHYS 106	Introduction to Modern Physics	3
PHYS 115	Electronics and Instrumentation	4
GR American Institutions (GOVT) ²		3
Elective of Choice		3
Units		16
Second Semester		
PHYS 110	Classical Mechanics	3
PHYS 124	Thermodynamics and Statistical Mechanics	3
Physics Elective ³		3
Upper Division GE Area 3 - Arts or Humanities + Writing Intensive ²		3
Elective of Choice		3
Units		15
Year 2		
First Semester		
Physics Elective ³		3
Upper Division GE Area 5 or 2 - Science or Mathematical Concepts/Quantitative Reasoning ²		3
Foreign Language Semester 1 ²		4
GR American Institutions (US History) ²		3
Elective of Choice		3
Units		16
Second Semester		
PHYS 135	Electricity And Magnetism	3
PHYS 175	Advanced Physics Laboratory	2
Physics Elective ³		3
Upper Division GE Area 4 - Social & Behavioral Sciences ²		3
Foreign Language Semester 2 ²		4
Units		15
Total Units		62

¹. Any course not completed in the first semester should be taken in the second or a later semester.

². Please see General Education/Graduation Requirement **course options** (https://www.csus.edu/academic-affairs/curriculum-%20workflow/_internal/_documents/program-road-maps/als_2yr/art_transfer-%20roadmap-2024-25.pdf).

³. Please see an academic advisor for elective options.

Career Options: Astronomers, Atmospheric and Space Scientists, Nuclear Technicians, Nuclear Monitoring Technicians, Nanotechnology Engineering Technologists and Technicians, Mechatronics Engineers, Robotics Engineers, Data Scientists, Computer Programmers, Software Developers, Physics Teachers, Postsecondary, Biochemists and Biophysicists