

BS IN PHYSICS (GENERAL PHYSICS)



SACRAMENTO STATE

In Workflow

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Approval Path

1. 2025-11-14T21:25:26Z
Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
2. 2025-11-17T17:26:04Z
Michael Ray (ray): Approved for PHYS Chair
3. 2025-11-19T23:32:06Z
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. 2025-11-24T17:28:08Z
Chris Taylor (ctaylor): Approved for NSM Dean

History

1. May 3, 2018 by clmig-jwehrheim
2. Aug 9, 2018 by 212408496
3. Aug 9, 2018 by 212408496
4. Oct 2, 2018 by 212408496
5. Apr 28, 2020 by 220267334
6. Apr 20, 2021 by 220267334
7. Jan 21, 2025 by Mikkel Jensen (mikkel.jensen)

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Viewing: BS in Physics (General Physics)

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Changes proposed by: Jerome Buerki (211413073)

Academic Group: (College)

Natural Sciences & Mathematics

Academic Organization: (Department)

Physics and Astronomy

Catalog Year Effective:

2026-2027 Catalog

Individual(s) primarily responsible for drafting the proposed degree major program:

Name (First Last)	Email	Phone 999-999-9999
Jerome Buerki	jerome.buerki@csus.edu	916-278-6540

Type of Program:

Major

Program Change Type:

Substantive

Delivery Format:

Fully Face to Face

Title of the Program:

BS in Physics (General Physics)

Designation: (degree terminology)

Bachelor of Science

Briefly describe the program proposal (new or change) and provide a justification:

This program change is being filed to reflect the following course changes in the department:

1. The course PHYS 106 has been approved as a GE upper division subject area 5: Science (formerly GE area B5).
2. The course PHYS 105 is being changed from a 3-unit course to a 4-unit course.
3. The course PHYS 175 is being changed from a 2-unit course to a 3-unit course and is being proposed as a writing intensive.

In addition, we propose to change the chemistry requirement to allow a choice between CHEM 1E or both of CHEM 1A and 1B (the current requirement). Few general physics programs nationwide require as many chemistry units as we do and we believe that most physics majors will be served adequately with taking CHEM 1E. We want to leave the option of taking CHEM 1A and CHEM 1B for those students who have a particular interest in chemistry.

We are also updating the list of eligible electives to reflect new courses being offered in the department.

University Learning Goals**Undergraduate Learning Goals:**

Competence in the disciplines
 Knowledge of human cultures and the physical and natural world
 Intellectual and practical skills
 Personal and social responsibility
 Integrative learning

Program Learning Outcomes**Program Learning Outcomes**

Learning Outcome
Apply scientific reasoning to solve advanced physics problems and design, carry out and analyze hands-on and numerical experiments.
Communicate physics concepts and particularly their own scientific results in written documents (e.g., senior project reports and research papers).
Explain physics concepts and particularly their own scientific results through a variety of media, including oral (e.g., presentations, seminars) and visual communication (e.g., graphs, figures, posters).
Apply scientific reasoning to solve advanced physics problems and/or to design, carry out, and analyze experiments.
Locate, retrieve, read, draw conclusions, and critically evaluate physics and other related scientific research literature.
Use physics concepts and mathematics to develop models that describe theoretical and/or experimental results or predict physics phenomena.
Act with professional integrity and employ scientific ethics in their professional interactions.
Integrate knowledge of physics concepts, mathematics, and related disciplines when performing their own scientific work.

Learning Outcomes Display

Course Code	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8
MATH 30								
MATH 31								
MATH 32								
MATH 45								
PHYS 11A								
PHYS 11B								
PHYS 11C								
PHYS 105								
PHYS 106								
PHYS 110								
PHYS 124								
PHYS 135								
PHYS 175								
CHEM 1E								
CHEM 1A								
CHEM 1B								
PHYS 115								
PHYS 145								
PHYS 136								
PHYS 150								
PHYS 151								
PHYS 156								
PHYS 191								
PHYS 115								
PHYS 116								
PHYS 130								
PHYS 142								
PHYS 145								
PHYS 152								
PHYS 162								
PHYS 163								
PHYS 172								
PHYS 195								
PHYS 199								
ASTR 150								

MATH 105B								
NSM 195A								
NSM 195B								

Will this program be required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

Please attach a Comprehensive Program Assessment Plan

BS Physics AssessmentPlan.docx

Please attach a Curriculum Map Matrix

BS Physics CurriculumMapMatrix.docx

Please attach a five-year budget projection

BudgetStatement.docx

Do these changes impact the degree roadmap?

Yes

Please attach the updated roadmap:

BS Physics (General Physics) roadmap.xlsx

Briefly describe the change:

The roadmap has been updated to implement the changes outlined in the program proposal justification.

Catalog Description:

Units required for Major: 70-84, includes units of study in chosen concentration (see below).

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.

As defined by policy <http://www.csus.edu/umannual/acadaff/fsm00010.htm>, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the "Program Change Type" field above to ensure that "Substantive" is selected.

Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

Program Requirements

Code	Title	Units
Required Lower Division Core Courses (27 Units)		
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 Core Courses (19 Units)		
PHYS 105	Mathematical Methods in Physics	4
PHYS 106	Introduction to Modern Physics	3
PHYS 110	Classical Mechanics	3
PHYS 124	Thermodynamics and Statistical Mechanics	3
PHYS 135	Electricity And Magnetism	3
PHYS 175	Advanced Physics Laboratory	3

Physics Colloquium Attendance

Fulfill a minimum attendance requirement.²

Concentration (24-38 Units)

Select from the following concentrations:

24 -
38

General Physics

Applied Physics

Biophysics

Total Units

70-84

¹ Course also satisfies General Education (GE)/Graduation Requirement.

² Majors must fulfill a minimum attendance requirement at Department Colloquia. Students should consult with the Department for details.

Concentration in General Physics (24-31 units)

Code	Title	Units
Required Courses (21-28 Units)		
CHEM 1E or CHEM 1A & CHEM 1B	General Chemistry for Engineering General Chemistry I General Chemistry II	4 - 10
PHYS 115 or PHYS 145	Electronics and Instrumentation Optics	3 - 4
PHYS 136	Electrodynamics of Waves, Radiation, and Materials	3
PHYS 150	Quantum Mechanics	3
PHYS 151	Advanced Modern Physics	3
PHYS 156	Classical and Statistical Mechanics	3
PHYS 191	Senior Project ³	2
Elective Courses (3 Units)		
Select three units of upper-division coursework chosen in consultation with an advisor ⁴		3
Total Units		24-31

³ Students must complete 2 units of PHYS 191, which can be taken as 1 unit over two consecutive semesters, or as 2 units in one semester.

⁴ See list below for a list of Department approved electives.

Elective List

Code	Title	Units
PHYS 115	Electronics and Instrumentation ⁵	4
PHYS 116	Advanced Electronics and Instrumentation	3
PHYS 130	Acoustics	3
PHYS 142	Applied Solid State Physics	3
PHYS 145	Optics ⁵	3
PHYS 152	Nuclear and Particle Physics	3
PHYS 162	Scientific Computing: Basic Methods	3
PHYS 163	Scientific Computing: Modeling, Simulation, and Visualization	3
PHYS 172	Biological Physics	3
PHYS 195	Teaching Internship	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
NSM 195A	STEM Pedagogical Practices	1
NSM 195B	Field Experience in Secondary STEM Classrooms	1

⁵ 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 Requirements⁶

Code	Title	Units
Area 1: English Communication (9 Units)		
1A - English Composition		3
1B - Critical Thinking		3
1C - Oral Communication		3
Area 2: Mathematical Concepts and Quantitative Reasoning (3 Units)		
Area 2 Course - Lower Division		3
Area 3: The Arts and Humanities (6 Units)		
3A - Arts		3
3B - Humanities		3
Area 4: Social and Behavioral Sciences (6 Units)		
Area 4 Course -Lower Division		3
Area 4 Course - Lower Division		3
Area 5: Physical and Biological Sciences (7 Units)		
5A - Physical Science		3
5B - Biological Science		3
5C - Laboratory		1
Area 6: Ethnic Studies (3 Units)		
Area 6 Course		3
Upper Division Courses: (9 Units)		
Area 3 Course - Upper Division		3
Area 4 Course - Upper Division		3
Area 2 OR Area 5 Course - Upper Division		3
Total Units		43

⁶ 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).

⁷ Required in Major; also satisfies GE.

Graduation Requirements⁶

Code	Title	Units
Graduation Requirements (required by CSU) (6 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI) ⁷		0
Graduation Requirements (required by Sacramento State) (6 Units)		
English Composition II		3
Race and Ethnicity in American Society (RE)		3
Foreign Language Proficiency Requirement ⁸		0

⁶ 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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⁷ Required in Major; also satisfies GE.

⁸ 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 are exempt from the Foreign Language Graduation Requirement.

Fiscal Impact to Change an Existing Program

Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:

We do not anticipate any fiscal impact on other departments. We have consulted with the departments whose courses we are including as major elective options.

Attach a copy of correspondence with these units:

BS in Physics (General Physics) - CHEM consultation.pdf

Provide a fiscal analysis of the proposed changes:

The proposed changes will not include any additional resources, except for the additional 1 unit being added to PHYS 105 and PHYS 175. These additional units will be taught by existing faculty as part of their assigned teaching load.

How will the above changes be accommodated within the department/College existing fiscal resources?

The additional 2 WTU will be taught by existing faculty as part of the standard assigned teaching loads.

Will the proposed changes require additional resources?

No

What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?

None.

Estimate the cost and indicate how these resource needs will be accommodated:

2 additional WTU to be taught by existing faculty in the department.

Key: 219