

# PHYSICS, BS

Natural Sciences, Mathematics, and Engineering (nsme) (<https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/>)

Department of Physics and Engineering (<https://catalog.csub.edu/general-information/csub-information/school-natural-sciences-mathematics-engineering/department-physics-engineering/>)

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[www.csub.edu/Physics/](http://www.csub.edu/Physics/) (<http://www.csub.edu/Physics/>)

Program Maps for Natural Sciences, Mathematics, and Engineering (<https://programmmap.csub.edu/academics/interest-clusters/4e942a6e-b8e4-4b60-a1ae-334235acc581/>)

## Program Description

The Physics program serves multiple roles in the College's educational system. Not only does it prepare students for advanced study and professional work in physics and other physical sciences such as geophysics, atmospheric physics, astronomy, etc., but it also provides the necessary education in physics for students of other sciences.

In view of the highly technological nature of the society in which we live, the department also places high priority on the education of the non-science student. The Physics program faculty participate in teaching the SCI courses, which are designed to help these students achieve an understanding of the methods and goals of science and to provide them an opportunity to seriously consider and discuss important socio-scientific-technological questions.

Although the minimum degree requirements are stated below, majors in Physics who plan to pursue careers as professional physicists are advised to take additional physics and mathematics courses. Members of the Physics faculty will be pleased to provide counseling on recommended programs to any students who may wish to pursue this major. For student learning objectives and more information, visit our website at [www.csub.edu/Physics](http://www.csub.edu/Physics) (<http://www.csub.edu/Physics/>).

## Program Requirements

Code	Title	Units
<b>General Education Requirements</b>		
	First-Year Seminar (FYS)	2
	Lower Division Area A: Foundational Skills	9
	Lower Division Area B: Natural Sciences <sup>3</sup>	3
	Lower Division Area C: Arts and Humanities	6
	Lower Division Area D: Social and Behavioral Sciences	3
	Lower Division Area E: Student Enrichment and Lifelong Learning (SELF) <sup>3</sup>	0
	Lower Division Area F: Ethnic Studies	3
	American Institutions: Government and History	6
	Junior Year Diversity & Reflection (JYDR)	3

Graduation Writing Assessment Requirement (GWAR) <sup>3</sup>	0
Upper Division Thematic Area C and D	6
General Education Capstone	1
<b>General Education Subtotal<sup>3</sup></b>	<b>42</b>

### Major Requirements

<i>Lower Division</i>		
PHYS 1010	Physics Freshman Orientation I	1
PHYS 1020	Physics Freshman Orientation II	1
PHYS 2010	Physics Sophomore Orientation I	1
PHYS 2020	Physics Sophomore Orientation II	1
PHYS 2070	Electric Circuits	4
PHYS 2210	Physics for Scientists and Engineers I	4
PHYS 2220	Physics for Scientists and Engineers II	4
PHYS 2230	Physics for Scientists and Engineers III	4

<i>Upper Division</i>		
PHYS 3010	Intermediate Laboratory in Modern Physics	3
PHYS 3070	Analog Electronics	3
PHYS 3110	Classical Mechanics I	2
PHYS 3120	Classical Mechanics II	2
PHYS 3210	Electricity and Magnetism I	2
PHYS 3220	Electricity and Magnetism II	2
PHYS 3310	Thermal Physics	3
PHYS 3500	Mathematical Methods for Physical Sciences & Engineering	2
PHYS 3510	Modern Physics	2
PHYS 4010	Advanced Laboratory in Modern Physics	2
PHYS 4410	Quantum Mechanics I	2
PHYS 4420	Quantum Mechanics II	2
PHYS 4900	Senior Seminar	2
Select two of the following: <sup>1</sup>		6
PHYS 3320	Statistical Mechanics	
PHYS 3520	Scientific Computing	
PHYS 4510	Condensed-Matter Physics	
PHYS 4520	Atomic and Molecular Physics	
PHYS 4700	Special Topics in Physics	
PHYS 4800	Research Participation	

<i>Cognates<sup>2</sup></i>		
MATH 2310	Single Variable Calculus I for Engineers	4
	or MATH 2510 Single Variable Calculus I	
MATH 2320	Single Variable Calculus II for Engineers	4
	or MATH 2520 Single Variable Calculus II	
MATH 2533	Multivariable and Vector Calculus	4
MATH 2540	Ordinary Differential Equations	4
CHEM 1000	Foundations of Chemistry	3
CHEM 1001	Foundations of Chemistry Laboratory	2
<b>Major Subtotal</b>		<b>76</b>
<b>Additional Units Needed Towards Graduation</b>		<b>2</b>

**Total Units** **120**

<sup>1</sup> And upper-division MATH, ECE, or ENGR with agreement from the academic advisor.

<sup>2</sup> Additional courses in Mathematics may be advised, depending upon the program needs of the individual student.

<sup>3</sup> Satisfied in major, minor or other university requirement. The SELF requirement is met by completing a LD Area B, C, or D course with a SELF component. GWAR is satisfied together with JYDR by completing ENGL 3119 Advanced Writing.

**Note:** One (1) semester unit of credit normally represents one hour of in-class work and 2-3 hours of outside study per week.

## **Science Teacher Preparation Program Leading to a Degree in Natural Sciences with a Concentration in Physics**

Completion of this program leads to a BS degree in Natural Sciences with a Concentration in Physics. This degree program offers the required subject matter content to help prepare prospective science teachers to apply for subject matter certification in California by taking the California Subject Matter Examinations for Teachers (CSET) in Science. Passage of these exams is required to certify subject matter competency before entering a teacher credential program for prospective teachers. Additional information may be obtained from the Physics and Engineering Department office (661) 654-2664.

For a detailed description of the course requirements please turn to the Natural Sciences section in this catalog.

## **Academic Regulations**

A grade of "C-" in PHYS 2210 Physics for Scientists and Engineers I and PHYS 2220 Physics for Scientists and Engineers II is the minimal grade acceptable for progression into subsequent Physics courses. Students who fail to achieve at least a "C-" may repeat the course. If a course is satisfactorily completed, the prior unsatisfactory grade will no longer bar a student from continuing in the Physics program.