

Physics

Physics deals with the structure of matter and with the forces of nature. As such, Physics is the study of the fundamental constituents of matter, the quarks, as much as it is the study of cosmic objects in the universe.

The CSUB Physics program serves multiple roles in the University's educational system. In addition to preparing students for advanced graduate study and professional work in physics and closely related fields such as geophysics, atmospheric sciences, and engineering, the program also provides students the education in physics necessary for other sciences.

The major provides a solid base in the classical subjects of mechanics, thermodynamics, and electromagnetism and an introduction to the modern physics of quantum mechanics, condensed-matter physics, and nuclear physics. The student learns how to apply physical principles and mathematical methods to a variety of problems and use electronics and other experimental techniques in practical laboratory investigations.

Training and Career Outlook

There are many opportunities for physicists to utilize their background in science. Research positions in academia and industry often require a graduate degree; thus, many of our graduates continue their studies at universities across the United States.

Students with a bachelor of science degree in physics are well qualified for a large number of careers in a variety of areas not commonly associated with physics, e.g. law, medicine, government, and business. Physicists compete successfully with engineers in many industries such as material science, computers, and electronics. Their ability to analyze and solve a wide range of problems is a valued qualification.

A degree in physics qualifies graduates to teach at the secondary level. The small number of physicists presently employed in the high schools and the strength of their education with the additional background in mathematics and chemistry make it particularly easy for physicists to find jobs in education.

Financial Aid

Financial Aid is provided for physics majors by the C. E. Strange Scholarship, which awards several thousand dollars every year.

Some of our students find part-time employment assisting faculty in their research projects.

"The individual attention received at CSUB has provided me with a better education."

Leon Elam
Physicist
Computer Science Corporation
Edwards Air Force Base



Natural Sciences, Mathematics & Engineering
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Physics / Requirements for the Major

Sample program for students who want to graduate with a degree in Physics.

Requirements for the Bachelor of Science in Physics

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1. All of the following lower division courses:
PHYS 221 Classical Physics I
PHYS 222 Classical Physics II
PHYS 223 Optics & Modern Physics
2. All of the following upper division courses:
PHYS 307 Circuit Theory and Electronics
PHYS 321 Classical Mechanics
PHYS 322A&B Thermal Physics
PHYS 323A&B Electricity & Magnetism
PHYS 324 Modern Physics
PHYS 411A&B Quantum Mechanics
PHYS 490 Senior Seminar
3. Two courses chosen from the following:
PHYS 313A&B Condensed-Matter Physics
PHYS 325 Principles of Geophysics
PHYS 412A&B Nuclear Physics
PHYS 477 Special Topics in Physics
PHYS 480 Research Participation
4. Cognates:
MATH 201 Calculus I
MATH 202 Calculus II **and**
MATH 222 Lab Experience I
MATH 203 Calculus III **and**
MATH 204 Calculus IV
MATH 302 Ordinary Differential Equations
CHEM 211 Principles of General Chemistry I
CHEM 212 Principles of General Chemistry II
CMPS 212 Computer Science 1

Science Teacher Preparation Program

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CSUB offers a Bachelor of Arts degree in Natural Science. Completion of the following course work satisfies the requirements for a Secondary Teaching Credential in Science and leads to a Natural Science B.A. with a Primary Concentration (major) in Physics and a secondary concentration (minor) in either Geology, Biology, or Chemistry.

1. Primary Concentration in Physics

- a. PHYS 110, 221, 222, 223, 307, 324, and 490 plus one additional 300 or 400 level Physics course acceptable for the major.

2. Secondary Concentration and Breadth (Select **one** of the following sets of courses):

- a. **Biology:** BIOL 210, 211, and 212, plus two additional 300 or 400 level Biology courses acceptable for the major; CHEM 211 and 212; GEOL 201 and 205.
- b. **Chemistry:** CHEM 211, 212, and 213, plus two additional 300 or 400 level Chemistry courses acceptable for the major; BIOL 210, 211 and 212; GEOL 201 and 205.
- c. **Geology:** GEOL 201, 205, 303, 307 and 320; BIOL 210, 211, and 212; CHEM 211 and 212.

Except for Senior Seminar (490), all courses must be completed with their respective laboratory components.

Requirements for the Minor

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Although no minor is required for the BS degree, a minor in Physics is available, consisting of 20 units, 10 of which must be in upper division courses that count toward the major.

Faculty

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Daniel Detwiler, Ph.D., Emeritus
Yale University

Alexander Dzyubenko, Ph.D.
Moscow State University

Vladimir Gasparyan, Ph.D.
Armenias National Academy of Science

Jeffrey Lewis, Ph.D.
University of California, Davis

Robert Negrini, Ph.D.
University of California, Davis

Jorge Talamantes, Ph.D. (Chair)
University of California, Riverside

CSUB Alumni Careers

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Richard Goode
Teacher, Porterville

Richard Darke, M.A.
Professor, Bakersfield College

Shawn Strange
Physicist
AETC, San Diego

Scholarships

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- Arts and Sciences Merit Award Scholarships
- C. E. Strange Scholarship