BIOPHYSICS

College of Natural and Behavioral Sciences
Department of Physics

Program Description & Features

The Biophysics program will train future professionals to research the physical and chemical aspects of biological phenomena, applying their knowledge of physics to the study of biological systems. Due to the interdisciplinary nature of the field, a biophysics major will employ a broad range of techniques such as spectroscopy, computational modeling, microscopy, mass spectrometry, and electrophysiology in the course of their research. The program emphasizes practical application of a wide range of theories and principles through laboratory experimentation and course lectures, which cover essential topics such as General Physics, Organic chemistry, Calculus, Biology, Optics, and Laser Physics. The program will has two options:

Option 1: Research Focus. This option provides research training to students. Students will complete a research portfolio. This will be done in special classes for research. This will show the students' progress through the program and how each of the PLOs are met. Students in this track are required to undertake at least 3 units of research studies. This can be accomplished by doing research with a selected faculty on campus or by completing an intensive summer research program.

Option 2: Professional Focus. This option is designed to prepare students for the healthcare industry. As part of this track, students are required to complete 30 volunteer hours in their profession of interest and shadow a practitioner for at least 8 weeks which is tied to an elective designed as a service-learning course.

Academic Advising

Students will be assigned to an advisor and will be expected to meet with their advisor once every semester. All students will use Smart Planner to track their progress. Students should set up an advisement appointment with a faculty member or an advisor in the CNBS Student Success Center when they need to discuss the following:

1. Major requirements.
2. Switching or declaring options within the major.
3. Submitting a graduation application.
4. Graduate school and other career goals.

Preparation

To be on target for a 4-year graduation pathway, it would be ideal if all students have at least taken Pre-Calculus, Biology, Chemistry, and Physics at the high school level.

It is also recommended that students participate in extracurricular research activities while in high school. Moreover, students could benefit more if they took calculus in high school.

Graduation with Honors

Undergraduate students who have met the following criteria will be awarded departmental honors at graduation:

1. A minimum of 36 units in residence at CSU Dominguez Hills.
2. An overall grade point average of 3.6 for upper-division courses taken for the major at CSUDH.

- Biophysics, Bachelor of Science (https://catalog.csudh.edu/academics/biophysics/biophysics-bs/)

BPH 201. Seminar I: Introduction to Biophysics. (1 Units)
Prerequisite: PHY 120. Course is designed to inform students about the field of biophysics, its career applications, and college success. Students will understand how physics can be integrated into biology and explore basic computational tools through a tutorial approach.
Offered Fall

BPH 202. SeminarII: The Art of Scientific Presentation and The Frontiers of Physics. (1 Units)
Prerequisites: BPH 201, PHY 120 are required or consent of instructor.Students learn how to prepare and give presentations on their research interests or discipline topics. Emphasis is given to the preparation, execution, and critique of effective scientific presentations.
Offered Spring, Summer

BPH 330. Biological Physics. (3 Units)
Prerequisites: BIO 122, BPH 202, PHY 306 and CHE 310 are required. Introduction to the interface between biology and physics, applying the results of thermodynamics to topics such as protein folding, molecular machines, brain function, with a focus on molecular and cellular biology.
Offered Fall

BPH 340. Experimental Biophysics. (3 Units)
Prerequisites: BPH 202, BIO 122, CHE 310 and PHY 306 are required. Co requisite: PHY 346 is required. A laboratory course introducing interdisciplinary research techniques and research writing in biophysics. Basic concepts behind commonly used biological techniques and how to collect and communicate discipline-specific data.
Offered Spring

BPH 402. BIOPHYSICS RESEARCH. (1-3 Units)
Prerequisite: PHY 306, BPH 340, or faculty permission. An independent research project, supervised by a faculty mentor in the physics or biophysics department.

BPH 406. Computational Biophysics. (3 Units)
Prerequisites: PHY 306, BPH 330, BPH 340. An introduction to scientific computational methods and their application in physics, using various numerical and symbolic computing techniques.

BPH 410. Medical Biophysical Education and Medical Industry Impact on Society. (3 Units)
Prerequisites: BPH 201, BPH 202, BPH 340. This course will help students meet the criteria for professional schools. The students will practice professional communication skills through healthcare practices. The course¿s service-learning component requires shadowing of healthcare professionals for eight weeks and completing thirty volunteer hours with community organizations.

BPH 460. Advanced Microscopy. (3 Units)
Prerequisite: PHY 306, PHY 320, BPH 330, BPH 340. An introduction to the use of quantitative fluorescence microscopy procedures in modern biophysics laboratories.