

Bachelor of Science in Biomedical Engineering (BSBME)

This new state-supported program was recommended by the Academic Senate on November 12, 2015 and concurred by the President November 25, 2015.

Bachelor of Science in Biomedical Engineering (120 units)

Program Description:

This degree is designed to prepare graduates for a variety of careers in the biomedical engineering field. The program builds upon a strong base of biology, mathematics, physics, chemistry, and engineering science to develop a clinically oriented biomedical engineer to serve medical and industrial needs. It includes courses and laboratories in biomedical engineering, physiology and biology. Elective units are available in the senior year to explore individual areas of interest.

Major Declaration

Freshmen admission to engineering majors is to a 'pre-major' status (i.e., PreBiomedical Engineering). Continuation in the major will be subject to meeting specific lower division course and GPA requirements at CSULB that indicate the student's ability to succeed and complete the major. Transfer applicants and CSULB students seeking admission into Biomedical Engineering must also meet similar major specific requirements. To become fully admitted into the Biomedical Engineering major, all prospective students (i.e., pre-majors, undeclared, major changes) must have a minimum cumulative 2.5 GPA and complete the following lower-division courses with a minimum grade of "C" prior to earning 60 units:

Core Lower-Division Major Requirements:

- MATH 122 (Calculus I), MATH 123 (Calculus II), PHYS 151 (Mechanics & Heat)

General Education Foundations Courses:

- Written Communication and Oral Communication.

Degree Progress

Students must complete the following requirements within one calendar year of declaring the major. Some students may need to take courses during Summer Session to meet these requirements. At the end of the year, students who have not met the requirements must either declare another major or meet with an Academic Advisor to determine if the student's performance in the courses merits an additional semester to complete.

First-Time Freshmen: A grade of "C" or better must be achieved in MATH 122 within one calendar year.

Transfer Students: A grade of "C" or better must be achieved in MATH 123 and PHYS 151 within one calendar year.

Requirements:

Lower Division

Take all of the following •

MATH 122 Calculus I (4)

Prerequisite: Appropriate MDPT placement or a grade of "C" or better in MATH 111 and MATH 113.

- ENGR 101 Introduction to Engineering Profession (1)
Prerequisite/Co-requisite: MATH 111 or MATH 113 or MATH 122 with a grade of "C" or better.
- CHEM 111A. General Chemistry (5)
Prerequisites: A passing score on the Chemistry Placement Examination.
Co-requisite: MATH 109 or higher.
- BME 100 Introduction to Biomedical Engineering (1) Prerequisites: None.
- BME 201 Programming for Biomedical Engineers (3) Prerequisites: Math 122
- MATH 123 Calculus II (4)
Prerequisite: MATH 122 with a grade of "C" or better.
- ENGR 102 Academic Success Skills (1)
Prerequisite: ENGR 101 with a grade of "C" or better.
- CHEM 111B. General Chemistry (5)
Prerequisites: CHEM 111A and MATH 113 or MATH 115 or MATH 119A or MATH 122 all with a grade of "C" or better.
- MATH 249 Linear Algebra and Differential Equations for Engineers (3)
Prerequisite: Math 123 with a grade of "C" or better.
- MATH 224 Calculus III (4)
Prerequisite: MATH 123 with a grade of "C" or better.

- PHYS 151 Mechanics and Heat (4)
Prerequisite/Co-requisite: MATH 122 with a grade of “C” or better.
- BME 210 Biomedical Signals and Circuits (3)
Prerequisites: CHEM 111B, EE 380, Math 249 all with a grade of “C” or better.
- BME 211 Biomechanics I (3)
Prerequisite: PHYS 151, MATH 224 all with a grade of “C” or better.
- BIOL 200 General Biology (4)
Prerequisites: GE Foundation Requirements
OR
BIOL 212 Molecular and Cell Biology (4) (or equivalent) Prerequisites: BIOL 211 or consent of instructor, CHEM 111A with grades of "C" or better. Prerequisite/Co-requisite: CHEM 111B.

Take one of the following

- BIOL 207 Human Physiology (4)
Prerequisites: GE Foundation Requirements
OR
BIOL 342 Human/Mammalian Physiology (3) (or equivalent)
Prerequisites: BIOL 211, BIOL 212, BIOL 213 all with grade of "C" or better or consent of instructor.
OR
BIOL 345 Comparative Animal Physiology (3)
Prerequisites: BIOL 211, 212, 213 all with a grade of “C” or better

Upper Division *Take all of the following*

- EE 380 Probability, Statistics & Stochastic Modeling (3)
Prerequisites: MATH 123; (CECS 100 or equivalent) all with a grade of "C" or better.
- BME 304 Digital Signal Processing (3)
Prerequisites: BME 210 with a grade of “C” or better.
- BME 311 Biomechanics II (3)
Prerequisites: BME 211, MATH 249 all with a grade of “C” or better
- BME 320 Engineering Data Acquisition and Analysis (4) Prerequisites: BME 210 with a grade of “C” or better. Co-requisite BIOL 207 or BIOL 342 or BIOL 345.
- BME 300 Bioinformatics and Proteomics (3)
Prerequisites: BIOL 200 or BIOL 212, MATH 249 with a grade of “C” or better.

- BME 350 Computational Physiology (3)
Prerequisites: BIOL 207 or BIOL 342 or BIOL 345, BME 304, BME 320 all with a grade of “C” or better.
- BME 360 Biomedical Instrumentation (4) Prerequisites: BME 320 with a grade of “C” or better.
- BME 370 Bio-fluids and Transport (3)
Prerequisites: MATH 249, PHYS 151, BIOL 200 or BIOL 212, BIOL 207 or BIOL 342 or BIOL 345 all with a grade of “C” or better.
- BIOL 466 Advanced Biomedical Research Methods (3) Prerequisites: None
- BME 490A Senior Capstone Project I (3)
Prerequisites: BME 350, BME 370 with a grade of “C” or better.
- BME 490B Senior Capstone Project II (3)
Prerequisite: BME 490A with a grade of “C” or better.

Take twelve units of electives from the following courses:

- BME 410 Biomedical Image Processing (3) Prerequisite: BME 350 with a grade of “C” or better.
- BME 420 Biomaterials (3)
Prerequisites: BIOL 200 or , BME 311 all with a grade of “C” or better.
- BME 430 Neurocritical Care (3)
Prerequisites: BME 350 with a grade of “C” or better.
- BME 440 Healthcare Informatics (3)
Prerequisites: BME 300 with a grade of “C” or better.
- BME 445 Biological Databases (3)
Prerequisites: BME 440 with a grade of “C” or better.
- BME 450 Stem Cell and Tissue Engineering (3)
Prerequisites: BME 420, BIOL 200 or BIOL 212 all with a grade of “C” or better

EFFECTIVE: Fall 2017

Campus Code: EE__BS03U1

College: 52

Career: UG

CIP Code: 14.051

CSU Code: 09051

PS 14-20