



**UNIVERSITY OF THE PACIFIC**

# Bioengineering

The Bachelor of Science degree in Bioengineering is offered by University of the Pacific's School of Engineering and Computer Science.

## BIOENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

Within a few years of graduation, graduates of the Bioengineering program are expected to be able to:

- + Apply engineering solutions to biomedical, human health or biological problems
- + Engage in lifelong learning and pursue advanced level studies
- + Demonstrate leadership, collaboration and communication skills in their profession

Bioengineering is an extremely exciting field. By integrating information, methods and tools of engineering with knowledge found in the sciences and mathematics, it promises challenging careers in a broad range of fields, including medical research and the design of medical instruments, to name a few.

For more information, contact:

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UNIVERSITY OF THE  
**PACIFIC**

School of Engineering  
and Computer Science

# BACHELOR OF SCIENCE IN BIOENGINEERING - PROGRAM CURRICULUM

## MATHEMATICS & BASIC SCIENCE

MATH 037 [4] STATISTICS & PROBABILITY  
 MATH 051 [4] CALCULUS I  
 MATH 053 [4] CALCULUS II  
 MATH 055 [4] CALCULUS III  
 MATH 057 [4] DIFFERENTIAL EQUATIONS  
 BIOL 051 [5] PRINCIPLES OF BIOLOGY  
 BIOL 061 [5] PRINCIPLES OF BIOLOGY  
 CHEM 025 [5] GENERAL CHEMISTRY I  
 CHEM 027 [5] GENERAL CHEMISTRY II  
 PHYS 053 [5] PHYSICS I  
 PHYS 055 [5] PHYSICS II

## GENERAL ENGINEERING:

ENGR 010 [1] DEAN'S SEMINAR  
 ENGR 020 [3] ENGINEERING MECHANICS I (STATICS)  
 ENGR 025 [1] PROFESSIONAL PRACTICE SEMINAR  
 ENGR 110 [2] INSTRUMENTATION AND EXPERIMENTAL METHODS  
 ENGR 110L [1] INSTRUMENTATION & EXPERIMENTAL METHODS LAB  
 MECH 015 [3] MECHANICAL ENGINEERING GRAPHICS

## CHOOSE ONE OF THE FOLLOWING:

ENGR 019 [3] COMPUTER APPLICATIONS IN ENGINEERING  
 COMP 051 [4] INTRO TO COMPUTER SCIENCE  
 COMP 061 [4] INTRO TO PROGRAMMING FOR DATA SCIENCE

## GENERAL EDUCATION

PACS 001 [4] PACIFIC SEMINAR 1  
 PACS 002 [4] PACIFIC SEMINAR 2  
 PACS 003 [3] PACIFIC SEMINAR 3  
 GEN. ED. [3-4] (I-A, I-B, OR I-C)\*  
 GEN. ED. [3-4] (I-A, I-B, OR I-C)\*  
 GEN. ED. [3-4] (II-A OR II-C)  
 ENGR 030 [3] ENGR., ETHICS & SOCIETY (II-B)  
 \*CATEGORY I GEN. EDS MUST BE FROM DIFFERENT AREAS.

## BIOENGINEERING CORE:

BENG 005 [2] INTRODUCTION TO BIOENGINEERING  
 BENG 103 [4] BIOMATERIALS  
 BENG 108 [5] ENGINEERING PHYSIOLOGY  
 BENG 124 [4] BIOMECHANICS  
 BENG 130 [4] BIOTRANSPORT  
 BENG 171 [4] BIOELECTRICITY  
 BENG 194 [3] BIOENGINEERING PROJECT PROPOSAL  
 BENG 195 [3] SENIOR PROJECT  
 ECPE 041 [3] CIRCUITS  
 ECPE 041L [1] CIRCUITS LABORATORY

## TECHNICAL ELECTIVES FOR EACH PATH:

**TRADITIONAL\*:** 3 TOTAL (1 MUST BE A BENG ELECTIVE AND 2 CAN BE FROM ELECTIVE LIST), 32 UNITS OF CO-OP

**BIOMEDICAL\*\*:** 1 BENG ELECTIVE, CHEM 121 ORGANIC CHEM I [5], CHEM 123 ORGANIC CHEM II [5]

\* TECHNICAL ELECTIVES FOLLOWING BIOMECHANICAL, BIOELECTRICAL, BIOCHEMICAL, OR BIOCOMPUTATION CAREER PATHS ARE RECOMMENDED, BUT NOT REQUIRED.

\*\* CO-OP OPTIONAL

## TECHNICAL ELECTIVES LIST:

BENG 140 [4] INTRO TO TISSUE ENGINEERING  
 BENG 154 [4] INTRO TO MRI  
 BIOL 101 [5] GENETICS  
 BIOL 145 [5] MICROBIOLOGY  
 BIOL 153 [4] CELL BIOLOGY  
 BIOL 146 [4] INDUSTRIAL MICROBIOLOGY  
 COMP 129 [4] SOFTWARE ENGINEERING  
 COMP 135 [3] HUMAN-COMP INTERFACE DSGN  
 COMP 151 [3] ARTIFICIAL INTELLIGENCE  
 COMP 153 [3] COMPUTER GRAPHICS  
 COMP 155 [4] COMPUTER SIMULATION  
 COMP 157 [4] DESIGN AND ANALYSIS OF ALGORITHMS  
 COMP 162 [4] DATA ANALYTICS PROGRAMMING  
 COMP 163 [4] DATABASE MANAGEMENT SYSTEMS  
 CHEM 121 [5] ORGANIC CHEMISTRY I  
 CHEM 123 [5] ORGANIC CHEMISTRY II  
 CHEM 141 [4] ANALYTICAL CHEMISTRY  
 CHEM 159 [4] BIOPHYSICAL CHEMISTRY  
 ECPE 071/071L [3/1] DIGITAL DESIGN AND LAB  
 ECPE 121 [4] DIGITAL SIGNAL PROCESSING  
 ECPE 141 [4] ADVANCED CIRCUITS  
 ECPE 131/131L [3/1] ELECTRONICS  
 ENGR 121 [4] MECHANICS OF MATERIALS  
 ENGR 120 [3] ENG. MECH II DYNAMICS  
 ENGR 122 [3] THERMODYNAMICS I  
 MECH 104 [3] INTRO. TO MECHATRONICS  
 MECH 150 [3] HEAT TRANSFER

## RECOMMENDED COURSES LIST FOR EACH CAREER PATH:

BIOMEDICAL	BIOELECTRICAL	BIOMECHANICAL	BIOCHEMICAL	BIOCOMPUTATION
BENG 154	BENG 154	BENG 140	BENG 140	BENG 154
BENG 140	ECPE 071/071L	BENG 154	CHEM 121	COMP 129
CHEM 121	ECPE 121	ENGR 120	CHEM 123	COMP 135
CHEM 123	ECPE 141	ENGR 121	CHEM 141	COMP 151
	ECPE 131/131L	ENGR 122	CHEM 159	COMP 153
		MECH 104	BIOL 101	COMP 155
		MECH 150	BIOL 145	COMP 157
			BIOL 153	COMP 162
			BIOL 146	COMP 163

BIOENGINEERING STUDENTS INTERESTED IN APPLYING TO MEDICAL SCHOOL SHOULD SEEK THE ADVICE OF THE PREMEDICAL ADVISOR.

MCAT PREPARATION REQUIRES ADDITIONAL COURSES OUTSIDE PROGRAM REQUIREMENTS, FOR EXAMPLE:

BIOL 101 [5] GENETICS  
 BIOL 169 [4] ELEMENTS OF BIOCHEMISTRY  
 PSYC 031 [4] INTRO TO PSYCHOLOGY  
 SOCI 051 [4] INTRO TO SOCIOLOGY

## COOPERATIVE EDUCATION PROGRAM (CO-OP)

32 UNITS OF COOPERATIVE EDUCATION WORK EXPERIENCE MUST BE COMPLETED FOR GRADUATION FROM THE SCHOOL OF ENGINEERING AND COMPUTER SCIENCE. BIOENGINEERS THAT COMPLETE THE BIOMEDICAL CAREER PATH OR NON-U.S. CITIZENS ARE EXEMPT FROM THIS REQUIREMENT. CO-OP COORDINATORS HELP ARRANGE RELEVANT FULL-TIME, PAID TRAINING JOBS WITH ENGINEERING EMPLOYERS.