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. The Bioengineering program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Bioengineering is an exciting field that weaves information, methods and tools of engineering with foundational knowledge in the sciences and mathematics. With their unique training, bioengineers are poised to develop innovative solutions to problems in medicine, biology and health. Bioengineering is also an excellent program for those students interested to study medicine, dentistry or other health professions after completing their undergraduate degree.

Bioengineering students study the breadth of bioengineering in a sequence of core classes. In addition, students select technical electives in disciplinary areas they wish to deepen their knowledge and are encouraged to cluster their electives along biochemical, biocomputation, bioelectrical or pre-health career paths. All bioengineering students complete a team-based senior design project, which provides an opportunity to apply science and engineering fundamentals and design methods to the solution of a real problem.

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 challenges
+ Engage in lifelong learning and pursue advanced level studies
+ Demonstrate ethical leadership, collaboration and communication skills in their profession

BIOENGINEERING PROGRAM EDUCATIONAL OBJECTIVES

All bioengineering students are encouraged to engage in professional development experiences outside the classroom. This could include research, internship, clinical shadowing, or volunteer experience. The SOECS CO-OP program supports students to secure a paid professional internship position for three to seven months. This program can provide students an invaluable experience that shapes their future career path.

Professional experience via experiential learning gives students a competitive edge in seeking bioengineering industry positions or admission to graduate, pre-health or medical programs after graduation.

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 051 [4] CALCULUS I (GE QUANTITATIVE REASONING)
MATH 053 [4] CALCULUS II
MATH 055 [4] CALCULUS III
MATH 057 [4] DIFFERENTIAL EQUATIONS
BIOL 061 [5] PRINCIPLES OF BIOLOGY (GE SCIENTIFIC INQUIRY)
PHYS 053 [5] PHYSICS I
PHYS 055 [5] PHYSICS II
CHOOSE ONE OF THE FOLLOWING:
- CHEM 024 [4] FUNDAMENTALS OF CHEMISTRY
- CHEM 025 [5] GENERAL CHEMISTRY I
- CHEM 027 [5] GENERAL CHEMISTRY II

GENERAL ENGINEERING:

IDEA 010 [2] INTERDISCIPLINARY DESIGN AND SUCCESS
ENGR 020 [3] ENGINEERING MECHANICS I (STATICS)
ENGR 025 [1] PROFESSIONAL PRACTICE SEMINAR
ENGR 030 [3] ENGR., ETHICS & SOCIETY (GE WORLD PERSPECTIVES & ETHICS)
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

CORE 001 [4] PROBLEM SOLIVING & ORAL COMMUNICATION
CORE 002 [4] WRITING & CRITIAL THINKING
GE [3-4] ARTISTIC PROCESS & CREATION
GE [3-4] CIVIC & GLOBAL RESPONSIBILITY
GE [3-4] LANGUAGE & NARRATIVES
GE [3-4] SOCIAL INQUIRY

BIOENGINEERING CORE:

BENG 103 [4] BIOMATERIALS
BENG 110 [4] BIOINSTRUMENTATION AND EXPERIMENTAL DESIGN
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
BIOL 180 [5] HUMAN PHYSIOLOGY

TECHNICAL ELECTIVES FOR EACH PATH:

3 TOTAL (1 MUST BE A BENG ELECTIVE AND 2 CAN BE FROM ELECTIVE LIST)
* TECHNICAL ELECTIVES FOLLOWING BIOMECHANICAL, BIOELECTRICAL, BIOCHEMICAL OR BIOCOMPUTATION CAREER PATHS ARE RECOMMENDED, BUT NOT REQUIRED.

RECOMMENDED COURSES LIST FOR EACH CAREER PATH:

PRE HEALTH	BIOELECTRICAL	BIOMECHANICAL	BIOCHEMICAL	BIOCOMPUTATION
BENG 104	**BENG 154**	BENG 140	BENG 140	**BENG 154**
BENG 154	BENG 175	BENG 154	CHEM 121	BENG 175
BENG 140	ECPE 071/071L	ENGR 120	CHEM 123	**COMP 129**
BIOL 101	ECPE 121	ENGR 121	CHEM 141	COMP 135
BIOL 145	ECPE 141	ENGR 122	CHEM 159	COMP 151
BIOL 153	ECPE 131/131L	MECH 104	BIOL 101	COMP 153
BIOL 169		MECH 150	BIOL 145	COMP 155
BIOL 170			BIOL 153	COMP 157
CHEM 121			BIOL 146	COMP 162
CHEM 123				COMP 163

BIOENGINEERING STUDENTS INTERESTED IN APPLYING TO MEDICAL SCHOOL SHOULD SEEK THE ADVICE OF THE PRE HEALTH ADVISOR. MEDICAL SCHOOL APPLICATION AND MCAT PREPARATION MAY REQUIRE ADDITIONAL COURSES OUTSIDE PROGRAM REQUIREMENTS.

TECHNICAL ELECTIVES LIST:

BENG 140 [4] INTRO TO TISSUE ENGINEERING
BENG 154 [4] INTRO TO MRI
BENG 175 [3] HUMAN-BRAIN MACHINE INTERFACE
BIOL 101 [5] GENETICS
BIOL 145 [5] MICROBIOLOGY
BIOL 146 [4] INDUSTRIAL MICROBIOLOGY
BIOL 153 [4] CELL BIOLOGY
BIOL 169 [4] ELEMENTS OF BIOCHEMISTRY
BIOL 170 [5] HUMAN ANATOMY
CHEM 121 [5] ORGANIC CHEMISTRY I
CHEM 123 [5] ORGANIC CHEMISTRY II
CHEM 141 [4] ANALYTICAL CHEMISTRY
CHEM 159 [4] BIOPHYSICAL CHEMISTRY
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
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 120 [3] ENGINEERING **MECH**ANICS II **(DYNAMICS)**
ENGR 122 [3] THERMODYNAMICS I
MECH 104 [3] INTRO. TO MECHATRONICS
MECH 150 [3] HEAT TRANSFER