



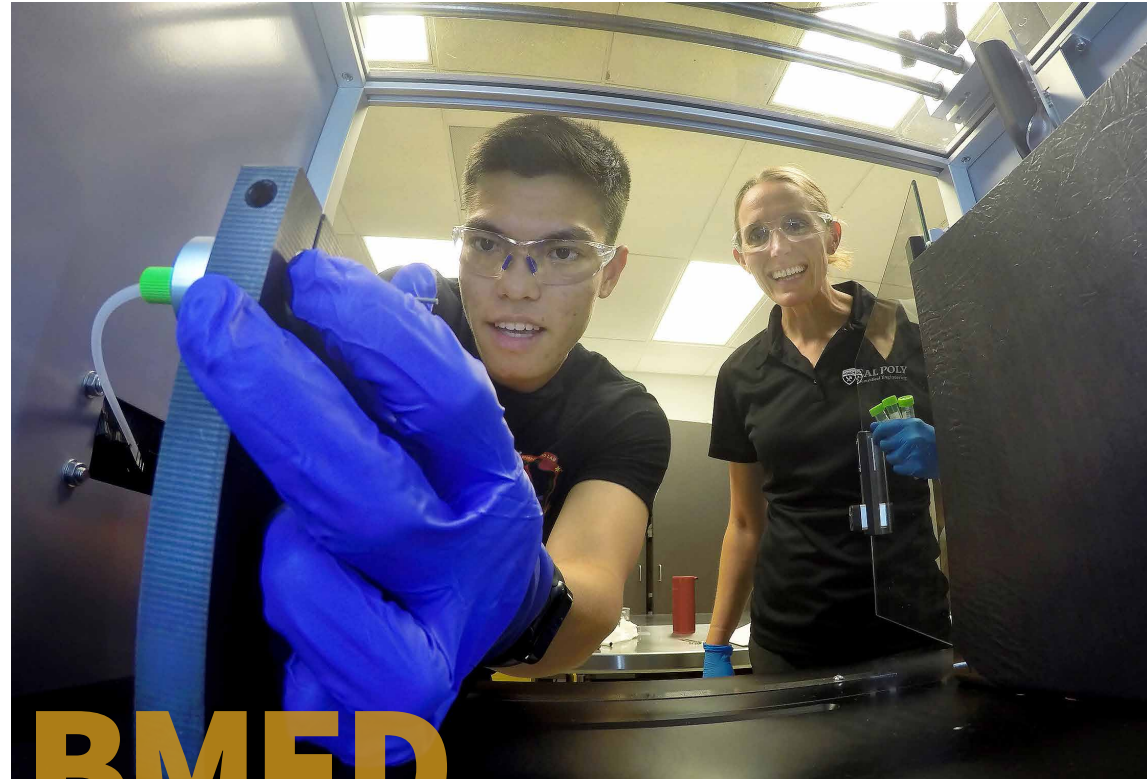
# BIOMEDICAL ENGINEERING

## PROGRAM DESCRIPTION

Biomedical engineering is an interdisciplinary field in which engineering principles and tools are applied to solve biomedical challenges. By its very nature, biomedical engineering is broad and requires a depth of understanding in engineering as well as in physiology and other biological sciences.

Biomedical engineering graduates are able to synthesize engineering expertise and medical needs to innovatively solve complex problems in biology and medicine.

This program is an excellent choice for those individuals considering careers in medicine as medical science continues to advance.



**385**  
undergraduate  
students

enrolled in  
biomedical  
engineering

**41**  
graduate  
students

enrolled in the  
blended B.S. and M.S.  
programs

## BIOMEDICAL ENGINEERING GRADUATES

Biomedical engineering graduates successfully transition into the medical device industry and often find jobs at prominent and global leaders in medical devices and healthcare. Major employers include Johnson & Johnson, GE Healthcare, Medtronic, Philips Healthcare, Samsung Healthcare and Toshiba Medical Systems.

## CONCENTRATIONS

**Bioinstrumentation:** This concentration prepares you for entry-level jobs in the biomedical devices industry where a deeper understanding of electrical engineering skills is necessary.

**Mechanical design:** This concentration prepares you for employment in the product development, design or manufacturing fields in the biomedical device industry.

## ASSOCIATED CLUBS

- **Biomedical Engineering Society** — [bmes.calpoly.edu](http://bmes.calpoly.edu)
- **Biomimicry Club** — [cpslobiomimicry.wordpress.com](http://cpslobiomimicry.wordpress.com)
- **Cure SLO** — [cure.org/c/calpoly](http://cure.org/c/calpoly)
- **Engineering World Health** — [cpsloewh.wix.com/cal-poly-ewh](http://cpsloewh.wix.com/cal-poly-ewh)
- **Engineers Without Borders** — [ewb.calpoly.edu](http://ewb.calpoly.edu)
- **Medical Design Club** — [mdc.calpoly.edu](http://mdc.calpoly.edu)
- **QL+ (Quality of Life Plus)** — [qlplus.calpoly.edu](http://qlplus.calpoly.edu)
- **Society of Women Engineers** — [swe.calpoly.edu](http://swe.calpoly.edu)



# B.S. IN BIOMEDICAL ENGINEERING

## Suggested Four-year Academic Flowchart • 2022-2026 Catalog

Updated 5/9/2022

FRESHMAN			SOPHOMORE			JUNIOR			SENIOR		
Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
<b>Introduction to the Biomedical Engineering Major</b> <b>BMED 101 (1)</b>	<b>Introduction to Biomedical Engineering Analysis</b> <b>BMED 102 (1)</b> (BMED 101)		<b>General Curriculum</b> <b>Engineering Design Communication</b> <b>ME 228 (2)<sup>1</sup></b>	<b>Introduction to Biomedical Engineering Design</b> <b>BMED 212 (3)</b> (MATH 143)	<b>General Curriculum</b> <b>Approved Support Elective</b> <b>(4)<sup>3</sup></b>	<b>Biomedical Engineering Measurement and Analysis</b> <b>BMED 310 (4)</b> (EE 201; CPE/CSC 101, CSC 231, 232, or 234)	<b>Biomechanics</b> <b>BMED 410 (4)</b> (CE 204 or 208; ME 212; BMED 310+)	<b>Principles of Biomaterials Design</b> <b>BMED 420 (4)</b> (CE 204 or 208; MATE 210; BMED 310+)	<b>Biomedical Engineering Transport</b> <b>BMED 425 (4)</b> (ME 302; ME 341)	<b>Biomedical Modeling and Simulation</b> <b>BMED 430 (2)</b> (BMED 310)	<b>General Curriculum</b> <b>Approved Technical Elective (300/400 level)</b> <b>(4)<sup>4</sup></b>
<b>Calculus I</b> <b>MATH 141 (4)</b> * [B4]	<b>Calculus II</b> <b>MATH 142 (4)</b> (MATH 141 w/min C- or Instr. Consent) [B4]	<b>Calculus III</b> <b>MATH 143 (4)</b> (MATH 142 w/min C- or Instr. Consent) [Area B Elective]	<b>Calculus IV</b> <b>MATH 241 (4)</b> (MATH 143)	<b>Linear Analysis I</b> <b>MATH 244 (4)</b> (MATH 143)	<b>Electric Circuit Theory</b> <b>EE 201 (3)</b> (MATH 244; PHYS 143)	<b>General Curriculum</b> <b>Mechanics of Materials II</b> <b>CE 207 (2)<sup>2</sup></b> (CE 204) or <b>Electronics</b> <b>EE 321 (3)<sup>2</sup></b> (EE 201)	<b>Engineering Physiology</b> <b>BMED 460 (4)</b> (BMED 310; BIO 231 or 232; or graduate standing)	<b>General Curriculum</b> <b>Approved Support Elective</b> <b>(4)<sup>3</sup></b>	<b>Biomedical Engineering Design I</b> <b>BMED 455 (4)<sup>5</sup></b> (BMED 410)	<b>Biomedical Engineering Design II: Senior Project</b> <b>BMED 456 (4)<sup>5</sup></b> (BMED 455)	<b>General Curriculum</b> <b>Approved Technical Elective (300/400 level)</b> <b>(4)<sup>4</sup></b>
	<b>General Physics I</b> <b>PHYS 141 (4)</b> (MATH 141 w/min C-; MATH 142+ or 182+) [Area B Elective]	<b>General Physics II</b> <b>PHYS 142 (4)</b> (PHYS 141; MATH 142 or 182)	<b>General Physics III</b> <b>PHYS 143 (4)</b> (PHYS 141; MATH 142; Recom: MATH 241)	<b>Engineering Statics</b> <b>ME 211 (3)</b> (MATH 241+; PHYS 131 or 141)	<b>Engineering Dynamics</b> <b>ME 212 (3)</b> (MATH 241; ME 211 or ARCE 211)	<b>Materials Engineering</b> <b>MATE 210 (3)</b> (CHEM 111 or 124 or 127; Recom: Concur MATE 215)	<b>Statistical Methods for Engineers</b> <b>STAT 312 (4)</b> * [Upper-Division B]	<b>General Curriculum</b> <b>Approved Technical Elective (300/400 level)</b> <b>(4)<sup>4</sup></b>	<b>Bioelectronics &amp; Instrumentation</b> <b>BMED 440 (4)</b> (BMED 310; EE 201)	<b>Contemporary Issues in BMED</b> <b>BMED 450 (4)</b> (Sr Standing)	
<b>General Chemistry for Physical Science and Engineering I</b> <b>CHEM 124 (4)</b> * [B1 & B3]	<b>General Chemistry for Physical Science and Engineering II</b> <b>CHEM 125 (4)</b> (CHEM 124)	<b>GE (4)</b> **	<b>Introduction to Cell &amp; Molecular Biology</b> <b>BIO 161 (4)</b> (Recom: CHEM 110, 124, or 127) [B2 & B3]	<b>Programming for Engineering Students</b> <b>CSC 231 (2)</b> (MATH 142; PHYS 121 or 131 or 141)	<b>Mechanics of Materials I</b> <b>CE 204 (3)</b> (ME 211)	<b>Choose one:</b> <b>Human Anatomy &amp; Physiology I or II</b> <b>BIO 231 (5)</b> or <b>BIO 232 (5)</b> (BIO 111 or 161; CHEM 110, 111, 124, 127, or PSC 102)	<b>Thermodynamics I</b> <b>ME 302 (3)</b> (ME 212; PHYS 142)	<b>Fluid Mechanics I</b> <b>ME 341 (3)</b> (MATH 242 or 244; ME 212)	<b>General Curriculum</b> <b>Approved Support Elective</b> <b>(4)<sup>3</sup></b>		<b>GE (4)</b> **
<b>Oral Communication</b> <b>COMS 101 or 102 (4)** [A1]</b> Can be taken anytime during Freshman Year				<b>GE (4)</b> **	<b>GE (4)</b> **	<b>GE (4)</b> **				<b>GE (4)</b> **	<b>GE (4)</b> **
<b>Expository Writing</b> <b>ENGL 133 or 134 (4)** [A2]</b> Can be taken anytime during Freshman Year											
<b>GE (4)</b> **	<b>Writing Arguments About STEM</b> <b>ENGL 147 (4) [A3]</b> (Completion of GE A2 with a C- or better) Can be taken anytime between Winter of Freshman and Winter of Sophomore Years					<b>Graduation Writing Requirement</b> <b>GWR*</b> (Students can attempt to fulfill the requirement after 90 earned units; students should complete the requirement before senior year)					
17	17	16	14	16	17	18-19	15	15	16	14	16
										<b>TOTAL:</b>	191-192

**Notes:**

**MOST GENERAL EDUCATION COURSES CAN BE TAKEN IN ANY ORDER AS LONG AS PREREQUISITES ARE MET**

\* Refer to current catalog for prerequisites.

\*\*One course from each of the following GE areas must be completed: A1, A2, C1, C2, Lower-Division C Elective, Upper-Division C, D1, Area D Elective, Lower-Division E, and F. Upper-Division C should be taken only after Junior standing is reached (90 units).

USCP requirement can be satisfied by some (but not all) courses within GE categories: C1, Upper-Division C, D1, D2, Upper-Division D, or E.

† Course can be taken previously or concurrently.

<sup>1</sup> ME 228 only required for the General Curriculum and the Mechanical Design Concentration.

<sup>2</sup> CE 207 or EE 321 is required for the General Curriculum. CE 207 is required for the Mechanical Design Concentration. CE 308 (5) may substitute for both CE 204 (3) and 207 (2).

<sup>3</sup> Refer to current catalog for course selection. Support electives must total 12 units.

<sup>4</sup> Refer to current catalog for course selection. Technical electives must total 12 units.

<sup>5</sup> ENGR 459, 460, 461, and BMED 400 (8 units) or ENGR 463, 464, 465, and BMED 400 (8) may substitute for BMED 455 and BMED 456 (8).

**UNLESS A CONCENTRATION IS DECLARED, THE DEFAULT WILL BE GENERAL CURRICULUM IN BIOMEDICAL ENGINEERING.**

**Legend:**

Course Title	Major (71-72)
Course # (Units)	Support (80)
(Prerequisite)	General Ed. (40)
[GE Area]	