BS BIOMEDICAL ENGINEERING
2022-2026

This document displays only your course requirements at the time of publication of the catalog. You must use your Degree Progress Report to track all your graduation requirements.

Note: No Major or Support courses may be selected as credit/no credit.

MAJOR COURSES		
BMED 101	Introduction to the Biomedical Engr Major	1
BMED 102	Intro to Biomedical Engineering Analysis	1
BMED 212	Intro to Biomedical Engineering Design	3
BMED 310	Biomedical Engineering Measurement & Analysis	4
BMED 410	Biomechanics	4
BMED 420	Principles of Biomaterials Design	4
BMED 425	Biomedical Engineering Transport	4
BMED 430	Biomedical Modeling and Simulation	2
BMED 440	Bioelectronics and Instrumentation	4
BMED 450	Contemporary Issues in Biomedical Engineering	4
BMED 455	Biomedical Engineering Design I [1]	4
BMED 456	Biomedical Engr Design II: Senior Project [1]	4
BMED 460	Engineering Physiology	4
General Curriculum in BS Biomedical Engineering or Concentration		28-33
Total Major Units		**71-76**

SUPPORT COURSES		
BIO 161	Intro to Cell & Molecular Biology (B2 & B3) [2]	4
BIO 231 or BIO 232	Human Anatomy and Physiology I Human Anatomy and Physiology II	5
CE 204	Mechanics of Materials I [3]	3
CHEM 124	Gen Chem for Physical Sci & Engineering I (B1) [2]	4
CHEM 125	General Chem for Physical Sci & Engineering II	4
CSC 231	Programming for Engineering Students	2
EE 201	Electric Circuit Theory	3
ENGL 147	Writing Arguments about STEM (A3) [2]	4
MATE 210	Materials Engineering	3
MATH 141	Calculus I (B4) [2]	4
MATH 142	Calculus II (B4) [2]	4
MATH 143	Calculus III (Area B Electives) [2]	4
MATH 241	Calculus IV	4
MATH 244	Linear Analysis I	4
ME 211	Engineering Statics	3
ME 212	Engineering Dynamics	3
ME 302	Thermodynamics I	3
ME 341	Fluid Mechanics I	3
PHYS 141	General Physics I (Area B Electives) [2]	4
PHYS 142	General Physics II	4
PHYS 143	General Physics III	4
STAT 312	Stat Methods for Engrs (Upper-Division B) [2]	4
Total Support Units		**80**

GENERAL EDUCATION		
Area A English Language Communication and Critical Thinking		
A1	Oral Communication	4
A2	Written Communication	4
A3	Critical Thinking (4 units in Support) [2]	0
Area B Scientific Inquiry and Quantitative Reasoning		
B1	Physical Science (4 units in Support) [2]	0
B2	Life Science (4 units in Support) [2]	0
B3	One lab taken with either a B1 or B2 course	
B4	Mathematics/Quantitative Reason (8 units in Support) [1]	0
Upper-Division B (4 units in Support) [2]		0
Area B Electives (8 units in Support) [2]		0
Area C Arts and Humanities		
Lower-division courses in Area C must come from three different subject prefixes.		
C1	Arts	4
C2	Humanities	4
Lower-Division C Elective - Select a course from either C1 or C2.		4
Upper-Division C		4
Area D Social Sciences		
D1	American Institutions (Title 5, Section 40404 Req)	4
Area D Elective - Select either a lower-division D2 or upper-division D course.		4
Area E Lifelong Learning and Self-Development		
Lower-Division E		4
Area F Ethnic Studies		
F	Ethnic Studies	4
Total GE Units		**40**
FREE ELECTIVES		**0**
TOTAL DEGREE UNITS		**191-196**

FOOTNOTES

1 ENGR 459, ENGR 460, ENGR 461 and BMED 400 (8); or ENGR 463, ENGR 464, ENGR 465, and BMED 400 (8) may substitute for BMED 455 and BMED 456 (8).
2 Required in Major or Support; also satisfies General Education (GE) requirement.
3 For students following the General Curriculum or Mechanical Design Concentration in BS Biomedical Engineering, CE 208 (5) may substitute for both CE 204 (3) and CE 207 (2).

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General Curriculum in Biomedical Engineering

This is the default curriculum required for students who do not declare a concentration.

CE 207 or EE 321	Mechanics of Materials II [1] Electronics	2-3
ME 228	Engineering Design Communication	2
Approved Technical Electives		12
BMED 355	Electrical Engineering Concepts for Biomedical Engineering	
BMED/CE/ME 404	Applied Finite Element Analysis	
BMED 422	Medical Device Evaluation and the FDA Approval Process	
BMED 432	Micro/Nano System Design	
BMED 434/MATE 430	Micro/Nano Fabrication	
BMED 435	Microfabrication Laboratory	
BMED 436	Characterization of Micro/Nano Scale Structures	
BMED 445	Biopotential Instrumentation	
BMED 459	Senior Thesis	
BMED 510	Principles of Tissue Engineering	
BMED 515	Introduction to Biomedical Imaging	
BMED 525	Skeletal Tissue Mechanics	
BMED/MATE 530	Biomaterials	
BMED 535	Bioseparations and Clinical Diagnostics	
BMED 550	Current and Evolving Topics in Biomedical Engineering	
IME 420	Simulation	
IME 430	Quality Engineering	
IME 435	Reliability for Design and Testing	
IME 527	Design of Experiments	
MATE 380	Thermodynamics and Physical Chemistry	
MATE 401	Materials Characterization Techniques	
MATE 410	Nanoscale Engineering	
MATE 425	Corrosion Engineering	
MATE/CHEM 446	Surface Chemistry of Materials	
ME 305	Introduction to Mechatronics	
ME 326	Intermediate Dynamics	
ME 403	Access by Design: Introduction to Rehabilitation Engineering	
Approved Support Electives		12
BIO 232	Human Anatomy and Physiology II	
BIO 302	Human Genetics	
BIO 303	Survey of Genetics	
BIO 351	Principles of Genetics	
BIO/CHEM 441	Bioinformatics Applications	
BIO 452	Cell Biology	
BUS 310	Introduction to Entrepreneurship	
CHEM 312	Organic Chemistry: Fundamentals & Applications	
CHEM 314	Biochemistry: Fundamentals and Applications	
IME 327	Test Design and Analysis in Manufacturing Engineering	
MATE 215	Materials Laboratory I	
MATE 222	Materials Selection Life Cycle	
MATH 344	Linear Analysis II	
MCRO 224	General Microbiology I	
Total Units		**28-29**

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Bioinstrumentation Concentration

BMED 355	Electrical Engineering Concepts for Biomedical Engr	4
BMED 445	Biopotential Instrumentation	4
EE 228	Continuous-Time Signals and Systems	4
EE 251	Electric Circuits Laboratory	1
EE/CPE 328	Discrete Time Signals and Systems	3
EE/CPE 368	Signals and Systems Laboratory	1
IME 156	Basic Electronics Manufacturing	2
MATH 344	Linear Analysis II	4
Approved Technical Electives		
Select from the following:		3-5
BMED 434	Micro/Nano Fabrication	
BMED 515	Introduction to Biomedical Imaging	
BMED 555	Neural Systems Simulation and Modeling	
EE 302 & EE 342	Classical Control Systems **and** Classical Control Systems Laboratory	
EE 335 & EE 375	Electromagnetic Fields and Transmission **and** Electromagnetic Fields & Transmission Lab	
Approved Electives		
Select from the following:		3-5
BIO 232	Human Anatomy and Physiology II	
BIO 302	Human Genetics	
BIO 303	Survey of Genetics	
BIO/CHEM 441	Bioinformatics Applications	
CHEM 312	Organic Chemistry: Fundamentals & Applications	
CHEM 446	Surface Chemistry of Materials	
Total Units		**29-33**

Mechanical Design Concentration

BMED 330 or ME 329	Intermediate Biomedical Design Mechanical Systems Design	4
CE 207	Mechanics of Materials II [1]	2
IME 141	Manufacturing Processes: Net Shape	1
MATH 344	Linear Analysis II	4
ME 228	Engineering Design Communication	2
ME 251	Intro to Detailed Design with Solid Modeling	2
ME 328	Design for Strength and Stiffness	4
Approved Technical Electives		
Select from the following:		7-8
BMED/CE/ME 404	Applied Finite Element Analysis	
BMED 525	Skeletal Tissue Mechanics	
IME 418	Product-Process Design	
IME 430	Quality Engineering	
IME 435	Reliability for Design and Testing	
IME 527	Design of Experiments	
ME 318	Mechanical Vibrations	
ME 326	Intermediate Dynamics	
ME 401	Stress Analysis	
ME 402	Orthopedic Biomechanics	
ME 403	Access by Design: Intro to Rehab Engineering	
ME 410	Experimental Methods in Mechanical Design I	
ME 412	Composite Materials Analysis and Design	
Approved Electives		
Select from the following:		3-5
BIO 232	Human Anatomy and Physiology II	
BIO 302	Human Genetics	
BIO 303	Survey of Genetics	
CHEM 312	Organic Chemistry: Fundamentals & Applications	
CHEM/MATE 446	Surface Chemistry of Materials	
Total Units		**29-32**

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