

Biomedical Engineering (BME)

Engineering Technical Electives are listed first, followed by General Technical Electives. (All Engineering Technical Electives can also be used for General Technical Elective credit.) Courses numbered 1000-2999 are considered lower-division and courses 3000-4999 are considered upper-division.

- Standard Curriculum requires a total of 15 Technical Electives, of which at least 12 must be upper-division and include at least 6 Upper-Division BME-Approved Engineering Technical Elective credits.
- Pre-Med Bioinstrumentation Track requires a total of 9 technical electives, of which at least 6 credits must be BME-Approved Engineering Technical Elective credits, and at least 6 credits of the total must be upper-division.
- Pre-Med Biomechanics Track requires a total of 12 Technical Elective credits all of which must be BME-Approved Engineering Technical Electives and of which at least 9 must be upper-division.

BME-APPROVED ENGINEERING TECHNICAL ELECTIVES

ASEN 1400: Gateway to Space

ASEN 1403: Intro to Rocket Engineering

ASEN 4128: Human Factors in Engineering and Design

ASEN 4519/5519: Medicine in Space and Surface Environments ASEN 5016: Space Life Sciences

CHEN 3200: Fluid Mechanics

CHEN 3210: Fluid Mechanics

CHEN 4650: Particle Technology

CHEN 4802: Tissue Engineering & Medical Devices CHEN 4803: Metabolic Engineering

CHEN 4804: Protein & Enzyme Engineering CHEN 4805: Biomaterials

CHEN 4820: Biochemical Separations

CHEN 4830: Chemical Engineering Biokinetics CHEN 4838: Protein & Enzyme Engineering

CHEN 4838/5838: Immunoengineering

CHEN 4838/5838: Biomolecular Simulations

CSCI 2270: Data Structures

CSCI 3104: Algorithms

CSCI 3352: Biological Networks

CSCI 3702: Cognitive Science

CSCI 4118: Software Engineering for Scientists CSCI 4314: Dynamic Models in Biology

CSCI 4118: Software Engineering for Scientists

CVEN 4511/5511: Intro to Finite Element Method

ECEN 1400: Intro to Digital and Analog Electronics

ECEN 2260: Circuits as Systems (only applies to Pre-Med Biomechanics Track)

ECEN 2270: Electronics Design Lab (only applies to Pre-Med Biomechanics Track)

ECEN 2350: Digital Logic

ECEN 3250: Microelectronics

ECEN 3400: Electromagnetic Fields and Waves
ECEN 4003/5003: Engineering Genetic Circuits
ECEN 4005/5005: Organic Electronic Materials & Devices
ECEN 4011: Design of Implantable Medical Devices
ECEN 4021/5021: Special Topics: Engineering Applications in Biomed: Neuromodulation
ECEN 4120: Neural Network Design
ECEN 4341/5341: Bioelectromagnetics
ECEN 5005: Biophotonics
ECEN 5022: Neuromodulation

GEEN 1400: Engineering Projects
GEEN 2400: Engineering Projects for the Community
GEEN 3400: Invention and Innovation

MCEN 2023: Statics and Structures (only applies to Pre-Med Bioinstrumentation Track)
MCEN 2043: Dynamics
MCEN 2063: Mechanics of Solids (only applies to Pre-Med Bioinstrumentation Track)
MCEN 3021: Fluid Mechanics
MCEN 4064/5046: Soft Machines
MCEN 4127/5127: Biomedical Ultrasound
MCEN 4137: Anatomy & Physiology for Engineers 2
MCEN 4154: Biocolloids and Biomembranes
MCEN 4174: Failure of Engineering Materials
MCEN 4195: Bioinspired Robotics
MCEN 4228/5228: Biofluids at the Macro Scale
MCEN 4228: Bioinspired Design
MCEN 4228/5228: Design of Coffee
MCEN 4228/5228: Food & Alcohol in the Ancient World
MCEN 4228/5228: Food Engineering
MCEN 4228/5228: Intro to Microfluidics
MCEN 4228/5228: Materials & Devices in Medicine
MCEN 4228/5228: Mechanics of Cancer
MCEN 4228/5228: Mechanics of Soft Matter
MCEN 4228/5228: Medical Device Design
MCEN 4228: Medical Devices in Medicine
MCEN 4228/5228: Microfluidics
MCEN 4228: MicroNanoBio
MCEN 4228/5228: Modeling of Human Movement
MCEN 4228/5228: Regenerative Biology and Tissue Repair
MCEN 4228: Surface Forces in Biology
MCEN 4228/5228: Thin Film Materials
MCEN 4228: Intro to Nanoscale Transport
MCEN 4228: Practical Electronics
MCEN 5228: Medical Robotics

GENERAL TECHNICAL ELECTIVES

All courses within the following ranges count as general technical electives. For example, all courses **between and including** APPM 3000 and APPM 4999 count as general technical electives.

AIRR 3020 (only applies to ROTC students) APPM 3000–APPM 4999
AREN 3000–AREN 4999
ASEN 3000–ASEN 4999
ASTR 3000–ASTR 4999
ATLS 3000– ATLS 4999
ATOC 3000–ATOC 4999
BUSM 3000–BUSM 4999
CHEM 3000–CHEM 4999
CHEN 3000–CHEN 4999
COEN 4830
CSCI 3000–CSCI 4999
CVEN 3000–CVEN 4999
EBIO 3000–EBIO 4999
ECEN 3000–ECEN 4999
ENEN 3000–EVEN 4999
EVEN 3000–EVEN 4999
EMEN 3000–EMEN 4999
GEOL 3000–GEOL 4999
IPHY 3000–IPHY 4999
MATH 3000–MATH 4999
MCDB 3000–MCDB 4999
MCEN 3000–MCEN 4999
MILR 3052, MILR 3062
NAVR 3030, NAVR 3040
PHYS 3000–PHYS 4999

RECOMMENDED GENERAL TECHNICAL ELECTIVES

APPM 3050: Scientific Computing in Matlab APPM 4380: Modeling in Applied Mathematics

APPM 4390: Modeling in Math Biology
APPM 4720: Mathematical Computational Biology

BCHM 4400: Core Concepts in Physical Chemistry for Biochemists
BCHM 4611: Principles of Biochemistry (only applies to non-Pre-Med students)

IPHY 3410: Intro to Human Anatomy (cannot be taken for credit in addition to BMEN 4117)
IPHY 3415: Human Anatomy Lab
IPHY 3430: Intro to Human Physiology (cannot be taken for credit in addition to BMEN 4117)
IPHY 3490: Introduction to Epidemiology

IPHY 4060: Cell Physiology
IPHY 4300: Pathophysiology of Disease IPHY 4540: Biomechanics
IPHY 4580: Sleep Physiology

MCDB 1161: From Dirt to DNA: Phage Genomics Laboratory I (only applies to non-Pre-Med students)
MCDB 2161: From Dirt to DNA: Phage Genomics Laboratory II (only applies to non-Pre-Med students)
MCDB 2171: Drug Discovery Through Hands-on Screens I (only applies to non-Pre-Med students)
MCDB 2150: Principles of Genetics (only applies to non-Pre-Med students)
MCDB 3000: Synthetic Biology: Engineering Biomolecular Systems in the Laboratory
MCDB 3145: Cell Biology
MCDB 3135: Molecular Biology
MCDB 3150: Biology of the Cancer Cell MCDB 3160: Infectious Disease
MCDB 3300: Personalized Medicine - Recent Advances in Diagnostics and Therapeutics
MCDB 3333: Biomed Innovations and Discoveries
MCDB 3350: Fertility, Sterility, and Early Mammalian Development
MCDB 3450: Biological Data Science
MCDB 3501: Structural Methods for Biological Macromolecules
MCDB 3650: The Brain - From Molecules to Behavior
MCDB 3700: Poisons in Cell Biology and Society
MCDB 4105: Function of Cellular and Nuclear, Assemblies, and Machines
MCDB 4150: Biology of Aging and Longevity
MCDB 4300: Immunology
MCDB 4312: Quantitative Optical Imaging
MCDB 4410: Human Molecular Genetics
MCDB 4420: Genetics of Brain and Behavior
MCDB 4422: Molecular Biology of Free Radicals: Role(s) in Oxidative Stress, Signaling, Disease, Aging
MCDB 4425: Topics in Membrane Biology: Cell Biology, Physiology and Disease
MCDB 4426: Cell Signaling and Developmental Regulation
MCDB 4427: Biology of the Visual System
MCDB 4444: Cellular Basis of Disease
MCDB 4520: Bioinformatics and Genomics
MCDB 4615: Biology of Stem Cells