

BIOMEDICAL ENGINEERING

Course Search

Not all courses are offered every semester. Refer to the schedule of courses for each term's specific offerings.

[More Info](#)

Courses at the University of Florida, with the exception of specific foreign language courses and courses in the online Master of Arts in Mass Communication program, are taught in English.

Courses

BME 1008 Introduction to Biomedical Engineering 1 Credit

Introduction to and overview of biomedical engineering. Lectures are given by faculty expert in an area of biomedical engineering. The goal is to give beginning students an appreciation for the breadth of the field and to guide them in making curriculum, major and career choices.

BME 1930 Special Topics in Biomedical Engineering 1-4 Credits

Selected topics in biomedical engineering.

BME 3012 Clinically-Inspired Engineering Design 3 Credits

Through Exposure to Real Clinical Problems, Learn to Communicate With Medical Professionals in Order to Identify Unmet Needs, to Develop Prototypes and Initial Concepts for Clinical Problems, and to Critically Evaluate Potential Solutions for Clinical Problems.

Prereq: BME 3060 with minimum grade of C

Coreq: BME 4409

BME 3053C Computer Applications for BME 2 Credits

Computer programming lab and lecture utilizes Matlab to analyze biomedical measurements.

Prereq: COP 2271 and COP 2271L or equivalent and MAC 2312, with minimum grades of C

BME 3060 Biomedical Fundamentals 3 Credits

Working specifically within the framework of biomedical engineering applications, provides the engineering fundamentals of the conservation laws of mass, energy, charge, and momentum.

Prereq: CHM 2046 or CHM 2096 and MAC 2313 with minimum grades of C

Coreq: PHY 2049, MAP 2302, and BME 1008

BME 3101 Biomedical Materials 3 Credits

Restoration of physiological function by engineering biomaterials for biological environment, covering principles underlying use and design of medical implants and matrices/scaffolds. Strong emphasis on transition from engineering material to biological tissue, including molecular and cellular interactions with biomaterials, tissue and organ regeneration, and design of intact, biodegradable, and bioreplaceable materials.

Prereq: BME 3060 with minimum grade of C and CHM 3217

BME 3234 Mechanical Behavior of Biological Tissues and Systems 3 Credits

Focuses on Understanding the Mechanical Behavior of Biological Tissues and Systems By Evaluating Structure-Function Relationships, Stress-Strain Relationships, and the Mechanical Complexity of Biological Systems. In Addition, the Basics of Viscoelastic Behavior Is Introduced as It Applies to Biological Tissues.

Prereq: BME 3060 with minimum grade of C and EGM 2511

BME 3323L Cellular Engineering Laboratory 3 Credits

The cellular engineering laboratory teaches the fundamentals of cell culture for use in biomedical engineering investigations. Acquire skills in cell culture, quantitative analyses, notebook keeping, report writing, and oral presentation.

Prereq: BSC 2010 and CHM 2046 with minimum grades of C

Coreq: BCH 4024 and PCB 3713C

BME 3508 Biosignals and Systems 3 Credits

Basic theory and techniques of biosignals and systems. Topics include sampling, noise in biological signals, signal averaging of noisy biological signals, Fourier analysis and filtering.

Prereq: MAC 2313 with minimum grade of C

BME 3941 Internship Experience in Biomedical Engineering 3 Credits

Engineering Work Experience Under the Supervision of An Engineer.

Prereq: BME major

BME 4160 Magnetic Biomaterials 3 Credits

Consists of classroom lectures on fundamental concepts in magnetism and magnetic micro and nano-materials and their applications in biomedicine. Participants present a critical review of recent literature in the field and lead a group discussion on a specific, recent paper.

Prereq: PHY 2048 and CHM 2046 or CHM 2096 with minimum grades of C

BME 4311 Molecular Biomedical Engineering 3 Credits

Introduces the fundamentals of molecular biology for biomedical engineers. Designed for juniors or seniors majoring in biomedical engineering to learn the nomenclature and current state of knowledge of the eukaryotic cell and its related structures. Topics include protein structure and function, enzymes, the structure and nature of DNA and the cellular structure and function of various cellular organelles. Learn about energy and the function of mitochondria and chloroplast, cellular communication and the function of the extracellular matrix.

Prereq: BSC 2010, (CHM 3217 or CHM 2210), and PCB 3713C with minimum grades of C

BME 4361 Neural Engineering 3 Credits

Applying Engineering to Neuroscience; Includes Such Diverse Areas as Neural Tissue Engineering, Models of Neural Function, and Neural Interface Technology. Focuses Mainly in the Context of Neural Interfaces and Prosthetics, From Basic Neural Physiology and Models of Neural Mechanisms to Advanced Neural Interfaces Currently in Development or Produced Commercially.

Prereq: BME 3508 or EEL 3135

BME 4409 Quantitative Physiology 3 Credits

A junior/senior level physiology course. Quantitative modeling of organ system physiology of the nervous system, the cardiovascular system and the respiratory system are discussed and students work on quantitative problems.

Prereq: PCB 3713C, MAP 2302, and BME 3060 with minimum grades of C

BME 4503 Biomedical Instrumentation 3 Credits

Covers engineering and medical bases of application, measurement and processing of signals to and from living systems. Biomedical transducers for measurements of movement, biopotentials, pressure, flow, concentrations and temperature are discussed, as well as treatment devices such as ventilators and infusion pumps.

Prereq: MAC 2313, MAP 2302, PHY 2049, and EEL 3111C with minimum grades of C

BME 4503L Biomedical Instrumentation Laboratory 1 Credit

Laboratory for BME 4503.

Prereq: MAC 2313, MAP 2302, PHY 2049, and EEL 3003 or EEL 3111C with minimum grades of C

<p>BME 4531 Medical Imaging 3 Credits Medical imaging technologies from a biomedical engineering perspective. The physics, mathematics, instrumentation and clinical applications of all common medical imaging modalities, including x-ray radiography, computed tomography (CT), ultrasound imaging, positron emission tomography (PET) and magnetic resonance imaging (MRI) are discussed. Emerging imaging modalities, including optical imaging, fluorescence imaging and photoacoustic imaging are also introduced. Prereq: MAC 2313, MAP 2302, and PHY 2049 with minimum grades of C</p>	<p>EGN 4912 Engineering Directed Independent Research 3 Credits Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery or application. (S-U)</p>
<p>BME 4621 Biomolecular Thermodynamics and Kinetics 3 Credits Principles of thermodynamics and kinetics from a biomolecular perspective. The mathematics, analysis, and applications of classical thermodynamics, statistical thermodynamics, and reaction kinetics are introduced in the context of molecular interactions, binding equilibria, metabolism, and biomolecular transport common to living systems.</p>	<p>EGS 1005 Prep for Success 1-4 Credits Freshman success course that includes academic preparation in calculus, chemistry, student success and technical communications. (S-U) Prereq: EG student</p> <hr/>
<p>BME 4632 Biomedical Transport Phenomena 3 Credits Introduces and applies the concepts of momentum, mass, and thermal energy transport in the context of problems of interest in biomedical sciences and engineering. Macroscopic and microscopic analysis of momentum, mass, and thermal energy transport problems in biomedical systems. Prereq: BME 3060 with minimum grade of C</p>	
<p>BME 4648 Biomaterials for Drug Delivery 3 Credits Focuses on the principles of engineering controlled release systems, and integrates topics in polymer chemistry, biomaterials, pharmacokinetics/ pharmacodynamics, and mass transport phenomena. Prereq: BME 3060 with a minimum grade of C</p>	
<p>BME 4760 Biomedical Data Science 3 Credits Covers the Biomedical Applications of Data Science Techniques, Which Include Pre-Processing Techniques, Machine Learning Data Analysis, and Data Visualization Techniques. Prereq: BME 3053C, COP 2271, and COP2271L</p>	
<p>BME 4882 Senior Design, Professionalism and Ethics 1 3 Credits Design of custom strategies to address real-life issues in the development of biocompatible and biomimetic devices for biotechnology or biomedical applications. Teams work with a client in the development of projects that incorporate various aspects of biomedical engineering including instrumentation, biomechanics, biotransport, tissue engineering and others. Emphasizes formal engineering design principles; overview of intellectual properties, engineering ethics, risk analysis, safety in design and FDA regulations are reviewed. Part 1 focuses on design. Prereq: BME 4503, BME 4503L, BME 4409, and senior standing</p>	
<p>BME 4883 Senior Design, Professionalism and Ethics 2 3 Credits Design of custom strategies to address real-life issues in the development of biocompatible and biomimetic devices for biotechnology or biomedical applications. Teams work with a client in the development of projects that incorporate various aspects of biomedical engineering including instrumentation, biomechanics, biotransport, tissue engineering and others. Emphasizes formal engineering design principles; overview of intellectual properties, engineering ethics, risk analysis, safety in design and FDA regulations are reviewed. Part 2 focuses on implementation and testing. Prereq: BME 4503, BME 4503L and senior standing</p>	
<p>BME 4931 Special Topics in Biomedical Engineering 1-4 Credits Selected topics in biomedical engineering.</p>	
<p>EGN 1935 Special Topics in Freshman Engineering 1-3 Credits Laboratory, lectures or conferences cover selected topics in engineering.</p>	