BIOMEDICAL ENGINEERING

Not all courses are offered every semester. Refer to the schedule of courses for each term’s specific offerings. More Info (http://registrar.ufl.edu/soc)

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.

Department Information

The J. Crayton Pruitt Family Department of Biomedical Engineering (BME) is part of the Herbert Wertheim College of Engineering and is a prime resource for biomedical engineering education, training, research, and technology development. BME is an ever-evolving field that uses and applies engineering principles to the study of biology and medicine in order to improve health care.

Website (https://www.bme.ufl.edu)

CONTACT

Email (undergrad@bme.ufl.edu) | 352.273.9222 (tel) | 352.273.9221 (fax)
P.O. BOX 116131
1275 Center Drive
BIOMEDICAL SCIENCES BUILDING JG56
GAINESVILLE FL 32611-6131
Map (http://campusmap.ufl.edu/#/index/0213)

Curriculum

• Biomedical Engineering
• Combination Degrees

Courses

BME 1008 Introduction to Biomedical Engineering 1 Credit
Grading Scheme: Letter Grade
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
Grading Scheme: Letter Grade
Selected topics in biomedical engineering.

BME 3012 Clinically-Inspired Engineering Design 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 3060, PCB 3713C, and ENC 3246 with minimum grades of C;
Corequisite: BME 3101 and EGM 2511.

BME 3053C Computer Applications for BME 2 Credits
Grading Scheme: Letter Grade
Computer programming lab and lecture utilizes Matlab to analyze biomedical measurements.
Prerequisite: COP 2271 and COP 2271L or equivalent and MAC 2312, with minimum grades of C.

BME 3060 Biomedical Fundamentals 3 Credits
Grading Scheme: Letter Grade
Working specifically within the framework of biomedical engineering applications, provides the engineering fundamentals of the conservation laws of mass, energy, charge, and momentum.
Prerequisite: (CHM 2046 or CHM 2096) and MAC 2313 with minimum grades of C.
Corequisite: PHY 2049, MAP 2302, and BME 1008.

BME 3101 Biomedical Materials 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 3060 with minimum grade of C and CHM 3217.

BME 3234 Mechanical Behavior of Biological Tissues and Systems 3 Credits
Grading Scheme: Letter Grade
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; introduces the basics of viscoelastic behavior as it applies to biological tissues.
Prerequisite: BME 3060 with minimum grade of C and EGM 2511.

BME 3323L Cellular Engineering Laboratory 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: PCB 3713C;
Corequisite: BME 4311 or instructor permission.

BME 3508 Biosignals and Systems 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: (EEL 3003 or EEL 3111C) and MAC 2313 with a minimum grade of C.

BME 3941 Internship Experience in Biomedical Engineering 0-3 Credits
Grading Scheme: S/U
Engineering work experience under the supervision of an engineer.
Prerequisite: Biomedical Engineering major.

BME 4160 Magnetic Biomaterials 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: PHY 2048 and CHM 2046 or CHM 2096 with minimum grades of C.
BME 4531 Biomedical Transport Phenomena 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 3060 with minimum grade of C.

BME 4532 Biomolecular Thermodynamics and Kinetics 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: CHM 3217 or (CHM 2210 and CHM 2211), with minimum grades of C, and BME 3060 and BME 4311

BME 4548 Biomaterials for Drug Delivery 3 Credits
Grading Scheme: Letter Grade
Focuses on the principles of engineering controlled release systems, and integrates topics in polymer chemistry, biomaterials, pharmacokinetics/pharmacodynamics, and mass transport phenomena.
Prerequisite: BME 3060 with a minimum grade of C.
Corequisite: BME 4632

BME 4632 Biomedical Transport Phenomena 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 3060 with minimum grade of C.

BME 4882 Senior Design, Professionalism and Ethics 1 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 3012 and senior standing.

BME 4883 Senior Design, Professionalism and Ethics 2 3 Credits
Grading Scheme: Letter Grade
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.
Prerequisite: BME 4882 and senior standing.

BME 4931 Special Topics in Biomedical Engineering 1-4 Credits
Grading Scheme: Letter Grade
Selected topics in biomedical engineering.

EGN 1935 Special Topics in Freshman Engineering 1-3 Credits
Grading Scheme: Letter Grade
Laboratory, lectures or conferences cover selected topics in engineering.
EGN 4912 Engineering Directed Independent Research 0-3 Credits
Grading Scheme: S/U
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)

EGS 1005 Prep for Success 1-4 Credits
Grading Scheme: S/U
Freshman success course that includes academic preparation in calculus, chemistry, student success and technical communications. (S-U)
Prerequisite: EG student.