BIOMEDICAL ENGINEERING (BME)

BME 4353 Image Formation and Processing (3)
See ELC 4353 for course information.

BME 4355 Medical Imaging (3)
Pre-requisite(s): C or better in ELC 3335 or concurrent enrollment; C or better in STA 3381
Overview of medical imaging systems including physics, modelling, and image reconstruction techniques. Systems covered include x-ray and ion CT, MRI, ultrasound, and PET/SPECT.

BME 4357 Cardiovascular Engineering and Instrumentation (3)
Pre-requisite(s): A grade of C or better in EGR 3380 or consent of instructor
A quantitative approach to the function and performance of cardiovascular elements, including ECG signal generation, blood flow rheology, and ventricular/vessel wall mechanics. Principles of measurement instrumentation including Fick dilution, ultrasound, and magnetic resonance imaging are explored. Major implant types are examined as well as FDA submission pathways.

BME 4360 Introduction to Biomedical Engineering (3)
Pre-requisite(s): C or better in ME 3320
Introduction to the interdisciplinary nature and broad scope of biomedical engineering. Topics covered will include biomechanics, biomaterials, biosensors, biomedical instrumentation, bioinformatics, prosthetic devices, and other biomedical engineering areas.

BME 4370 Biomaterials: Form and Function (3)
Pre-requisite(s): A grade of C or better in ME 3320
A traditional mechanical/materials engineering approach will be used to explore the structure and function relationship of naturally occurring biological materials. Emphasis is on mechanical design and function with some discussion of physical properties. Materials used in medical devices will be compared and contrasted with naturally occurring biomaterials.

BME 4372 Bioinstrumentation (3)
See ELC 4372 for course information.

BME 4374 Biomechanics (3)
Pre-requisite(s): A grade of C or better in ME 3320
Introduction to biomechanics. Topics covered include: review of fundamental principles of mechanics, human musculoskeletal physiology and anatomy, properties of biological materials, methods and practice of measuring biological signals, biomechanical modeling and simulation, and applications of biomechanical study.

BME 4376 Introduction to the Design and Evaluation of Medical Devices (3)
Pre-requisite(s): A grade of C or better in EGR 3380 Project-based introduction to medical device design and evaluation
Topics to be covered include: clinical needs finding, design criteria generation, basic anatomy, design evaluation, prototyping, regulatory process, intellectual property, and validation process. Students will work in teams to address a real medical problem.

BME 4378 Introduction to Biosensors (3)
See ELC 4378 for course information.

BME 4396 Special Topics in Biomedical Engineering (3)
Pre-requisite(s): Consent of department chair
Study of advanced topics in biomedical engineering. This course may be repeated once under a different topic.

BME 4452 Biomedical Digital Signal Processing (4)
Pre-requisite(s): A grade of C or better in ELC 3335 and STA 3381
Discrete-time signals and systems, sampling theory, z-transforms, spectral analysis, filter design, applications, analysis, and design of digital signal processing systems. Laboratory emphasis on biomedical applications of digital signal processing. Credit cannot be earned for ME 4452 if credit is earned for ELC 4451.

BME 4V97 Special Projects in Biomedical Engineering (1-6)
Pre-requisite(s): Consent of department chair
Advanced topics and/or special project activities in biomedical engineering.