INTERDISCIPLINARY DEGREES

Graduate Directors in Engineering: Ian Gravagne and Stephen T. McClain

The Department of Electrical and Computer Engineering and the Department of Mechanical Engineering jointly administer degrees that are interdisciplinary in nature.


Biomedical Engineering (BME)

BME 4353  Image Formation and Processing (3)  Cross-listed as ELC 4353  See ELC 4353 for course information.

BME 4370  Biomaterials: Form and Function (3)  Pre-requisite(s): A grade of C or better in ME 3320 and 3322  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)  Cross-listed as ELC 4372  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 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.

BME 5351  Multidimensional Signal Analysis (3)  Cross-listed as ELC 5351  See ELC 5351 for course information.

BME 5353  Biomedical Signal Analysis (3)  Cross-listed as ELC 5353  See ELC 5353 for course information.

BME 5357  Cardiovascular Engineering and Instrumentation (3)  Cross-listed as EGR 5357, ELC 5357, ME 5357  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, as well as FDA submission pathways, are examined.

BME 5360  Introduction to Biomedical Engineering (3)  Pre-requisite(s): Consent of instructor  An 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 5375  Biomechanical Computer Modeling (3)  Pre-requisite(s): Graduate standing in Engineering  An investigation into the methods of computer modeling and simulation for the study of human musculoskeletal biomechanics.

BME 5376  Medical Device Design and Evaluation (3)  Project-based introduction to medical device design and evaluation. Topics include: clinical needs finding, design criteria generation, basic anatomy, design evaluation, prototyping, regulatory process, intellectual property, and validation process. Students work in teams on real medical problems and serve on committees to provide guidance for the project teams on either intellectual property or regulatory standards.

BME 5390  Research Methods and Project Formulation (3)  Cross-listed as EGR 5390, ELC 5390  See ELC 5390 for course information.

BME 5396  Special Topics in Engineering (3)  Cross-listed as EGR 5396, ELC 5396, ME 5396  See EGR 5396 for course information.

BME 5397  Special Projects in Engineering (3)  Cross-listed as EGR 5397, ELC 5397, ME 5397  See EGR 5397 for course information.

BME 5V99  Master's Thesis (1-6)  Students completing a master’s program with a thesis must complete six hours of BME 5V99.