



Biomechanics or Bioinformatics Emphasis: Course Suggestions

2022-2026 Catalog

This list of classes is a suggestion for you as you build your Emphasis. You will have to make sure you have the pre-requisites and in some cases you also might need to get permission from the faculty teaching the class.

BMED 212: Introduction to Biomedical Engineering Design. General introduction to bioengineering design. A review of technological needs, design methodology, testing procedures, statistical analysis, governmental regulations, evaluation of costs and benefits, quality of life, and ethical issues.

BMED 310: Biomedical Engineering Measurement and Analysis. Fundamentals of biomedical engineering analysis. Use and application of tools and analytical methods used by bioengineers.

BMED 410: Biomechanics. Introduction to physiological systems, with emphasis on structure and function of major tissues and organs. Application of mechanics to understand the behavior of these tissues and organs at gross and microscopic levels. Bioelastic solids. Rigid body biomechanics. Biofluids, basic mechanical properties of collagen and elastin, bone, cartilage, muscles, blood vessels, and other living tissues.

BMED 420: Principles of Biomaterials Design. Biocompatibility of materials. Materials characterization and design. Natural and synthetic polymeric materials. Wound repair, foreign body response, blood clotting. Transplantation biology, artificial organs, and tissue engineering. Medical devices, government regulations, and ethical issues.

BMED 440: Bioelectronics and Instrumentation. Analog and digital circuits in bioinstrumentation. Biomedical signals in continuous and discrete systems. Sampling and digital signal processing. Ultrasound, MRI, CT, Bioelectromagnetics. Biophysical phenomena, transducers, and electronics.

EE 321 and 361: Electronics and Laboratory. Semiconductor devices and circuits. Instrumentation amplifiers, power control rectifiers, feedback, pulse circuits, digital logic circuits.

IME 335: Computer-Aided Manufacturing I. Use of the computer to communicate design information to manufacturing. Computer Numerical Control (CNC) programming. Overview of manufacturing systems in an automated environment, including cellular manufacturing and computer-aided process planning.

ME 305: Introduction to Mechatronics. Introduction to microcontrollers and assembly language programming. Emphasis on components and techniques for interfacing that are typical of embedded microcontroller applications (A/D conversion, D/A conversion, interrupts, timers, and pulse-width modulation). Laboratory exercises involve real-time interfacing of microcontrollers to external mechanical and/or electromechanical devices.

CSC 231: Programming for Engineering Students. Programming techniques and procedures with applications to engineering problems. Introduction to numerical methods and simulation

CHEM 441: Bioinformatics Applications. Introduction to new problems in molecular biology and current computer applications for genetic database analyses. Use of software for: nucleic acid, genome and protein sequence analysis; genetic databases, database tools; industrial applications in bioinformatics; ethical and societal concerns.

BIO 409: Advanced Anatomy and Physiology. Muscle and Locomotion. Anatomy and physiology of musculoskeletal systems, including energetics and biomechanics of locomotion. Discussion of invertebrates and vertebrates with emphasis on humans. Includes human cadaver study.