ENGINEERING, BIO (ENBI)

ENBI 4200 Medical Device Development (4 Credits)
Working in a fast-paced competitive biomedical R&D firm is a dramatic change of pace from most college classes. This course will create a realistic industry environment where students take on the role of development engineers to design and manufacture real-world medical devices. This course is intended to provide a working knowledge of the design and development process specifically for medical device applications.

ENBI 4500 Biofluids (4 Credits)
The application of fluid dynamics theory and design to problems within the biomedical community. Specific topics covered include the mechanics of inhaled therapeutic aerosols, basic theory of circulation and blood flow, foundations in biotechnology and bioprocessing, and controlled drug delivery. Cross listed with ENBI 3500.

ENBI 4510 Biomechanics (4 Credits)
An introduction to the mechanical behavior of biological tissues and systems. Specific topics covered include: Analysis of the human musculoskeletal system as sensors, levers, and actuators; Joint articulations and their mechanical equivalents; Kinematic and kinetic analysis of human motion; Introduction to modeling human body segments and active muscle loading for analysis of dynamic activities; Mechanical properties of hard and soft tissues; Mechanical and biological consideration for repair and replacement of soft and hard tissue and joints; Orthopedic implants. Cross listed with ENBI 3510.

ENBI 4520 Introduction to Cardiovascular Engineering (4 Credits)
An introduction to cardiovascular mechanics with a focus on the quantitative understanding of the mechanical phenomena that governs the cardiovascular system. Specific topics covered include: basic principles of circulation including macro and micro circulation, soft tissue mechanics, applications to cardiovascular diseases, modelling techniques, clinical and experimental methods, and design of cardiovascular devices. Recommended prerequisites: ENME 2541 and ENME 2661.

ENBI 4530 Biomechanics of Human Movement (4 Credits)
An introduction to engineering-based analysis of human movement. Topics include: musculoskeletal anatomy, nueromuscular physiology, muscle mechanics, electromyography, sensorimotor integration, anthropometry, kinematics and kinetics. Recommended pre-requisite material: knowledge of MATLAB, ENGR 1572.

ENBI 4600 Biomedical Engineering: Technology, Research, and Design (4 Credits)
Introduction to Biomedical Engineering is an interdisciplinary course that combines engineering principles with biological and medical sciences to advance healthcare in areas such as diagnosis, monitoring, and therapy. The course provides a foundational understanding of biomedical engineering and prepares students for further study or careers in the field.

ENBI 4610 Experimental Design in Biomedical Sciences (4 Credits)
This course offers an in-depth exploration of experimental design principles within the biomedical sciences, emphasizing statistical analysis, measurement techniques, and ethical considerations. It aims to provide students with practical skills necessary for designing, conducting, and analyzing biomedical research.

ENBI 4620 Bioelectronics (4 Credits)
This course introduces the principles and applications of bioelectronics, focusing on the interface between biological systems and electronic devices. It covers the fundamentals of electronic circuits, signal processing, and sensor technology, and their applications in areas like biometric monitoring, neuroprosthetics, and biosensing.

ENBI 4630 Biomaterials (4 Credits)
This course provides an introduction to the field of biomaterials science, focusing on the fundamental principles, properties, and applications of materials used in biomedical engineering and healthcare. Topics covered include the classification of biomaterials, biocompatibility, interactions with biological systems, surface modifications, fabrication techniques, characterization techniques and current applications in tissue engineering, regenerative medicine, drug delivery, and medical devices.

ENBI 4800 Adv Topics (Bioengineering) (1-5 Credits)
Various topics in Bioengineering as announced. May be taken more than once. Prerequisite: varies with offering.

ENBI 4991 Independent Study (1-5 Credits)

ENBI 4995 Independent Research (1-18 Credits)