

Biomedical Engineering

BE 5000 - Graduate Research

Includes the study of an acceptable biomedical engineering problem and the preparation of a report or thesis.

Credits: variable to 12.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5100 - Cell and Tissue Mechanics

Focuses on mechanical behavior and adaptation of musculoskeletal tissues including material properties, viscoelasticity, fatigue and failure. Includes the role of mechanical forces in the development, growth and adaptation of musculoskeletal tissues; cell biology and cellular mechanotransduction.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s): Graduate

BE 5110 - Neuroengineering

Brief overview of neuroanatomy, neurophysiology, and neurobiology followed by introductions of more advanced topics including neural tissue engineering, neural/electrode interfaces, and functional electrical stimulation.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s): Graduate

BE 5200 - Biology for Engineers II

Covers, at an advanced level, the general principles and engineering applications of science and biology, including cell biology, physiology, molecular biology, genetics, and biotechnology.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5300 - Advanced Polymeric Biomaterials

A specialized study of polymers used in biomedical engineering. Topics include: processing-structure-properties relationships for polymers, polymer fibers and composites, degradation of polymers, and medical applications for composite biomaterials.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5440 - Genetic Engineering

Molecular medicine and its applications in genetic engineering will be discussed following a quick review of genetics and cell biology as well as the human disease mechanisms. In vivo, in vitro and ex vivo treatments utilizing genetically engineered products, allogeneic and autologous cell transplantation experiments will be discussed.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5510 - Cardiovascular Engineering

Fundamental cardiovascular pathology and the biomedical engineering approaches being developed and used toward problems resulting in significant cardiovascular deficiency such as myocardial infarction, chronic kidney disease, atherosclerosis, and heart valve disease.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5550 - Biostatistics for Health Science Research

An overview course of biostatistical methods used in the health sciences. Topics include a review of undergraduate statistical concepts, NIH, CDC, and FDA guidelines for clinical trial research, proper use of biostatistical methods including anova models, logistic regression, risk analysis, survivorship analysis and any other statistical methods that are common in the enrolled students' discipline.

Credits: variable to 4.0

Semesters Offered: On Demand

Pre-Requisite(s): MA 2720 or MA 3710

BE 5660 - Active Implantable Devices

Implantable devices that are actively delivering therapy and acting as monitoring tools will be covered. Emphasis will be on the technology and its application. Devices include electrical stimulators, pumps & diagnostic instrumentations.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5700 - Biosensors

This course introduces the student to the fundamentals of biosensor development and applications. It provides an understanding of biological components, immobilization methods, transducers, and fabrication techniques.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5750 - Bioapplications of Nanotechnologies

The prospect of bioapplications of nanotechnologies, selected topics including nanodevices for biosensor and drug delivery, biocompatibility and toxicity of nanomaterials, nanostructured polymers for tissue engineering, design and operation of medical nanorobots, ethics and societal impacts of nanobiotechnology, etc.

Credits: 2.0

Lec-Rec-Lab: (2-0-0)

Semesters Offered: Fall - Offered alternate years beginning with the 2005-2006 academic year

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5800 - Advanced Biomaterials Interfaces

This course introduces the students to the effects of topography and texture on the performance of biomaterials. Special emphasis is placed on tissue engineering scaffolds and microfabrication and nanofabrication techniques. Some of the topics include: self-organization of biomembranes and supramolecular systems, bioactive materials, and the molecular basis for surface recognition and masking.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: On Demand

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5900 - Biomedical Engineering Topics

Biomedical engineering courses will be offered as professional electives dependent upon the interest of the faculty.

Credits: variable to 6.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 5940 - Introduction to Tissue Engineering

Explore the application of engineering principles toward the construction/reconstruction of human tissue. Fundamental biological principles involved in tissue engineering are reviewed from an engineering perspective with examples of engineered tissues such as blood vessels, skin, liver, cartilage and bone.

Credits: 3.0

Lec-Rec-Lab: (3-0-0)

Semesters Offered: Spring

Restrictions: Permission of instructor required; Must be enrolled in one of the following Level(s): Graduate

BE 6000 - Doctoral Research

Includes the study of an acceptable biomedical engineering problem and the preparation of a report or thesis.

Credits: variable to 12.0; May be repeated; Graded Pass/Fail Only

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

BE 6900 - Biomedical Engineering Topics

Biomedical engineering courses will be offered as professional electives dependent upon the interest of the faculty.

Credits: variable to 6.0; May be repeated

Semesters Offered: Fall, Spring, Summer

Restrictions: Must be enrolled in one of the following Level(s): Graduate

Graduate Course Descriptions Effective Fall 2007

https://www.banweb.mtu.edu/pls/owa/stu_ctg_utils.p_online_all_courses_gr

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