

BIOMEDICAL ENGINEERING (BME)

BME 2001 Special Topics (LAB 0.0 and LEC 0.0)

This course is designed to give the department an opportunity to test a new course. Variable titles.

BME 3001 Special Topics (LAB 0.0 and LEC 0.0)

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BME 3100 Fundamentals of Transport in Biomedical Engineering (LEC 4.0)

This course covers the fundamentals of momentum, energy, and mass transport with an emphasis on the applications in biology and biotechnology. General differential equations for momentum, energy, and mass transfer are presented and solved for a variety of biomedical engineering problems. Prerequisites: A grade of "C" or better in Math 3304 and either Chem Eng 2110 or Cer Eng 3230.

BME 4000 Special Problems (IND 0.0-6.0)

Problems or readings on specific subjects or projects in the department. Consent of instructor required. Prerequisites: Permission of the instructor.

BME 4001 Special Topics (LAB 0.0 and LEC 0.0)

This course is designed to give the department an opportunity to test a new course. Variable titles.

BME 4091 Biomedical Engineering Design I (LEC 3.0)

Design considerations for biomedical engineering manufacturing and biomaterials design emphasizing traditional engineering design concepts and engineering economic analysis. Prerequisites: Preceded or accompanied by English 3560 and either Chem Eng 5250 or MS&E 5310.

BME 4097 Biomedical Engineering Design II (LEC 3.0)

Application of engineering design principles to the solution of a biomedical engineering problem. Communication emphasized course. Prerequisites: BME 4091.

BME 4099 Undergraduate Research (IND 0.0-6.0)

Designed for the undergraduate student who wishes to engage in research. Not for graduate credit. Not more than six hours allowed for graduation credit. Subject and credit to be arranged with the instructor. Prerequisites: Consent of instructor required.

BME 4100 Biomedical Polymers and Metals (LEC 3.0)

The structure of polymers and metals and their use in bio-applications with emphasis on how the structures influence processing, mechanical properties, and corrosion. Prerequisites: Chem Eng 3210.

BME 5001 Special Topics (LAB 0.0 and LEC 0.0)

This course is designed to give the department an opportunity to test a new course. Variable titles.

BME 5100 Drug and Gene Delivery Systems (LEC 3.0)

Overview of drug and gene delivery systems, rational design for their applications with an emphasis on structure-property-function relationships. Three major parts: polymers and nanoparticles as drug and gene carriers; strategies to deliver drugs and genes; in vitro and in vivo techniques of assessment and validation. Prerequisites: Chem 2210 and Bio Sci 2213.

BME 5200 Materials as Hard Tissue Devices (LEC 3.0)

The structure-property relationships of materials employed as medical devices, as well as the bone, cartilage, and ligament that they are designed to replace. The behavior of materials in the physiological environment, the tailoring of that behavior as a response to both bulk and surface properties, and the future of hard tissue medical devices. Prerequisites: BME 4100 or MS&E 5210.

BME 5300 Vaccine Manufacturing (LEC 3.0)

The development, manufacturing, and approval process of vaccines are covered. Vaccines that use attenuated or inactivated viruses, viral components and mRNA as the active ingredient are discussed. The manufacturing process includes the making of the active ingredient, vaccine formulation and delivery. The class includes three remote lab experiments. Prerequisites: Senior standing in an engineering discipline, physics, chemistry, or biology.

BME 5311 Integrity and Ethics in Bioengineering (LEC 1.0)

Study of ethical, social, and legal issues that arise in biotechnology and pharmaceutical industries and in biomedical research. Emphasis on professional attitudes and standard practices. Prerequisites: Senior or graduate standing.

BME 6099 Research (IND 0.0-15)

Investigations of an advanced nature leading to the preparation of a thesis or dissertation. Consent of instructor required.

BME 6400 Biomanufacturing (LEC 3.0)

The development, production, recovery, and analysis of biorelated products. Specific topics include biomaterial synthesis and characterization, cell culture, bioreactor design and operation, production and purification process development, and regulatory expectations. Prerequisites: graduate standing.

BME 6500 Pharmaceutical Process Engineering (LEC 3.0)

The manufacture, extraction, processing, purification, formulation/filling, and packaging of pharmaceutical materials to be used as medications for humans or animals. The major manufactured products and their principal manufacturing steps will be covered. The principles of engineering operations and scale-up process in pharmaceutical industry will be discussed together with quality control, pollution prevention, and Good Manufacturing Practices (GMP). Prerequisites: Chem Eng 5250.
