

School of Engineering offerings, with the exception of offerings that meet Liberal Learning requirements, are restricted to School of Engineering majors or to students with academic programs requiring specific School of Engineering offerings. Enrollment for non-majors interested in exploring School of Engineering offerings is by permission of the department chairperson.

BME 251/Fundamentals of Biomedical Engineering **1 course unit**

(spring semester)

Prerequisites: PHY 202 with a C- or better; MAT 128 with a C- or better

Introduction to biomedical engineering through critical thought and analysis of unique engineering problems. The conservation laws of mass, energy, and momentum will be developed and applied to identify and define problem systems, formulate appropriate relationships, and solve problems found in the diverse field of biomedical engineering.

BME 311/Physiological Systems **1 course unit**

(fall semester)

Prerequisites: BIO 185, CHE 202, BME 251

Control and integration of physiological function of the systems of the human body. Study of structure and function of systems, and homeostatic mechanisms in health and disease. Overview of sensory and biological control systems.

BME 333/Physiological Systems Laboratory **.5 course unit**

(laboratory)

(fall semester)

Corequisite: BME 311

Analysis of physiological systems through measurement of human physiological signals. Reaction time, biological potentials (ECG, EMG) and cardiopulmonary responses will be explored as a function of appropriate variables, including body position, gender, and exercise. Communication through written and oral presentation using descriptive and inferential statistical analysis will be emphasized.

BME 343/Biomechanics **1 course unit**

(same as MEC 343)

(with design hour)

(spring semester)

Prerequisite: MEC 251

Comprehensive study of structure, function, and mechanical properties of biological soft and hard tissues. Topics include joint and tissue mechanics, analysis of tissue remodeling, fatigue and fracture resistance, and mechanical properties of skeletal tissue.

BME 371/Physiological Systems II **1 course unit**

(spring semester)

Prerequisite: BME 311

Continuation of BME 311, with an emphasis on integrative function within and between systems.

BME 391/Independent Study **.5-1 course unit**

(occasionally)

Prerequisite: Permission of instructor and department

For advanced students wishing to pursue a special area of interest. Topic(s) developed in consultation with a faculty advisor.

BME 423/Introduction to Biomaterials **1 course unit**

(same as MEC 423)

(with design hour)

(fall semester)

Prerequisite: CHE 201

Introduction to metal, polymeric, ceramic, and biological materials used as surgical implants in humans. Topics include acute and chronic biological response to implants, degradation of artificial materials, artificial organs, and medical devices. Consideration of ethical issues.

BME 470/Special Topics in Biomedical Engineering

1 course unit

(with design hour)

(occasionally)

Prerequisite: Permission of instructor and department

Study of advanced topics in biomedical engineering chosen by the instructor.

BME 473/Bioinstrumentation

1 course unit

(same as ELC 473, MEC 473)

(with laboratory)

(spring semester)

Prerequisites: ENG 212, ENG 214, BME 311

Theory and design of biomedical instruments used for measurements on humans and animals.

Detailed coverage of sensors and transducers that quantify force, pressure, flow, sound, temperature, and displacement. Origin of biopotentials (ECG, EMG, EEG) and biological signal processing. Consideration of noise, interference, and electrical safety issues.

BME 495, 496/Senior Project I, II

0, 1 course unit

(every semester)

Prerequisites: Senior standing, BME 371

Senior project focuses students' previous experience upon a specific technical biomedical engineering project. Library research, preliminary design, evaluation of alternatives, project planning, cost and scheduling analysis, written reports, and oral presentation. Students work closely with a biomedical engineering faculty advisor.