

**BME 251/Introduction to Biomedical Engineering** **1 course unit**

(spring semester)

*Prerequisite:* PHY 202

Introduction to specializations within the field of biomedical engineering. Overview of classical and current trends related to biosensors and instrumentation, physiological models, biomechanics, and biomaterials. Consideration of ethical and biosafety issues.

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

(fall semester)

*Prerequisites:* BIO 185, CHE 202

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

Measurement and analysis of human physiological signals, from an engineering point of view. Biological potentials (ECG, EMG, EEG) and cardiopulmonary function. Physiological effects of sleep and exercise.

**BME 343/Biomechanics** **1 course unit**

(same as MEC 343)

(with design hour)

(fall 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, CSC 215

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)

(spring 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

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

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.