

Biomedical Engineering — BMEN

Courses

BMEN 6810 FUNDAMENTALS OF BIOMEDICAL ENGINEERING (3) LEC. 3. Application of engineering principles to human health. A wide range of biomedical engineering topics are discussed, including biomaterials, drug delivery, cell and tissue biomanufacturing, bioinformatics, computation in biomedical engineering, medical imaging and diagnostics, biomechanics, and medical devices. Restricted to engineering graduate students or by instructor permission.

BMEN 6830 CELL AND TISSUE ENGINEERING (3) LEC. 3. Application of engineering and physical principles to understand and manipulate biological processes at the cellular, tissue, and organ-levels. Restricted to engineering graduate students or by instructor permission.

BMEN 6840 COMPUTATIONAL BIOMEDICAL ENGINEERING FUNDAMENTALS (3) LEC. 3. Fundamental computational techniques in biomedical engineering, including scientific programming, data visualization, statistics, numerical methods, and machine learning. Restricted to engineering graduate students or by instructor permission.

BMEN 6850 QUANTITATIVE PHYSIOLOGY (3) LEC. 2. LAB. 1. An integration of engineering fundamentals with core anatomical and physiological principles to develop a systems-based understanding of the structure-function relationship of major organ systems, as well as the engineering methods used to quantify human physiology. Restricted to engineering graduate students or by instructor permission.

BMEN 6860 BME PROJECT MANAGEMENT, BIOETHICS, AND RESEARCH SKILLS (3) LEC. 3. Training in biomedical engineering project management, research skills, professional skills, and bioethics. Restricted to engineering graduate students or by instructor permission.

BMEN 6870 QUANTITATIVE AND MATHEMATICAL METHODS IN BME (3) LEC. 3. Quantitative and mathematical methods for analysis and problem solving in biomedical engineering. Restricted to engineering graduate students or by instructor permission.

BMEN 6880 MODELING AND ANALYSIS IN BIOMEDICAL ENGINEERING (3) LEC. 3. Introduces the application of computational biomathematical modeling techniques for biological systems. Topics include modeling frameworks, interaction diagrams, variable and process definition, systems model development, parameter estimation, and analysis of steady states, stability, sensitivity, and dynamic behavior. Students perform numerical simulations, phase plane analysis, and apply modeling techniques to biomedical systems such as gene and protein networks, metabolic pathways, population models, personalized medicine, and synthetic biology. Enrollment limited to engineering graduate students or by instructor permission.

BMEN 6890 PROTEIN ENGINEERING APPLICATIONS (3) LEC. 3. Survey of methods used to engineer proteins and the applications of designed functional biological molecules. Covers molecular biological methods, recombinant DNA techniques, and computational tools for protein structure visualization and design. Emphasizes practical applications in protein engineering and includes journal article review, student presentations, and discussion of current research. Enrollment limited to engineering graduate students or by instructor permission.

BMEN 6970 ADVANCED SPECIAL TOPICS IN BIOMEDICAL ENGINEERING (1-6) LEC. Topical courses in specialized areas of biomedical engineering. Departmental approval required. Course may be repeated for a maximum of 30 credit hours.

BMEN 7900 INDEPENDENT STUDY (1-10) IND. SU. Supervised study in specialized areas of biomedical engineering. Topic must be arranged with instructor during pre-registration. Departmental approval required. Course may be repeated for a maximum of 30 credit hours.

BMEN 7950 GRADUATE SEMINAR (1) SEM. 1. SU. Graduate seminar addressing research topics related to biomedical engineering. Course may be repeated for a maximum of 12 credit hours.

BMEN 7990 RESEARCH AND THESIS (1-9) MST. Individual master's thesis research. May be repeated for credit. Course may be repeated with change in topics. Course may be repeated for a maximum of 9 credit hours.

BMEN 8990 RESEARCH AND DISSERTATION (1-30) DSR. Individual doctoral dissertation research. May be repeated for credit. Course may be repeated with change in topics. Course may be repeated for a maximum of 30 credit hours.