

**BIOMEDICAL
ENGINEERING**

BME

**Department of Biomedical
Engineering
College of Engineering**

425 Biomaterials and Biocompatibility
Fall. 3(3-0) Interdepartmental with Materials Science and Engineering. Administered by Materials Science and Engineering. P: MSE 250 RB: PSL 250 R: Open to juniors or seniors in the College of Engineering. SA: BME 424, MSE 324

Materials science of human implants. Design requirements imposed by the human body, and need for bodily protection.

444 Biosensors for Medical Diagnostics
Spring. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Biosystems Engineering. P: (BS 161 or BS 181H or LB 145) and (CEM 141 or CEM 151) and (ECE 302 or ECE 345 or BE 334 or CEM 333) R: Open to juniors or seniors or graduate students in the College of Engineering. SA: BE 445

Biosensors, their components, properties, and associated electronics for applications in medical diagnostics.

490 Independent Study
Fall, Spring. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Approval of department.

Individualized reading and research in biomedical engineering or bioengineering.

490A Independent Study in Clinical Biomechanics
Fall. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.

Individualized reading and research in the application of biomechanics to clinical cases.

490B Independent Study in Biomaterials
Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Approval of department.

Individualized reading and research in the application of biomaterials.

491 Special Topics
Fall, Spring. 3 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.

Special topics in biomedical engineering or bioengineering.

494 Biofluid Mechanics and Heat Transfer
Fall. 3(3-0) Interdepartmental with Mechanical Engineering. Administered by Mechanical Engineering. P: (ME 410 or concurrently) or (CHE 311 or concurrently) or (BE 350 or concurrently) R: Open to juniors or seniors or graduate students in the College of Engineering.

Applications of fluid mechanics, heat transfer, and thermodynamics to biological processes, including blood flow in the circulatory system, heart function, effects of heating and cooling on cells, tissues, and proteins. Pharmacokinetics.

495 Tissue Mechanics
Spring. 3(3-0) Interdepartmental with Mechanical Engineering. Administered by Mechanical Engineering. P: (ME 222) R: Open to students in the College of Engineering. SA: MSM 441

Application of solid mechanics to understanding mechanical responses of biological tissues. Microstructure and biological function for soft and hard connective tissues and muscle.

497 Biomechanical Design in Product Development
Spring. 3(3-0) Interdepartmental with Mechanical Engineering. Administered by Mechanical Engineering. P: ME 370 or concurrently R: Open to juniors or seniors in the Department of Mechanical Engineering. SA: BME 491A, MSM 445

Biomechanical product design with application to people or animals. Synthesis, prototyping, and analysis of designs. Project management. Market research.

803 Research Methods
Fall. 3(3-0)
Skills required for graduate research. Critically reviewing the literature, defining a fundamental research problem, effective oral and written technical presentations, ethics and statistics.

840 BioDesignIQ I
Fall. 3(2-3) RB: Bachelor's and/or Master's degree in an engineering discipline or a biological science related to medicine. R: Open to graduate students in the College of Engineering or approval of department.

Introduction to and application of medical technology innovation and entrepreneurship using the Bidesign process to address areas of under-met clinical needs.

841 BioDesignIQ II
Spring. 3(2-3) P: BME 840 RB: Bachelors and/or Masters degree in an engineering discipline or a biological science related to medicine. R: Open to doctoral students in the College of Engineering or approval of department.

Continuation of BME 840. Product innovation and design to meet healthcare needs and satisfy key stakeholders. Prototyping to de-risk product concepts. Customer discovery. Regulatory pathways. Intellectual property protection. Commercialization strategies.

844 Biosensor Principles and Applications
Spring. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Biosystems Engineering. RB: Knowledge of biology, chemistry, and electronics. SA: BE 845
Nanotechnology-based biosensors, their components, desirable properties, and associated electronics. Applications related to healthcare, biodefense, food and water safety, agriculture, bio-production, and environment. Multidisciplinary interactions necessary for biosensor development.

891 Selected Topics in Biomedical Engineering
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Approval of department.
Special topics in biomedical engineering of current importance.

892 Biomedical Engineering Seminar
Fall, Spring. 1(1-0)
Presentations of detailed studies of one or more specialized aspects of biomedical engineering

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 24 credits in all enrollments for this course.
Master's thesis research.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 36 credits. A student may earn a maximum of 36 credits in all enrollments for this course.
Doctoral dissertation research.