Biomedical Engineering, B.S.E.

Requirements

The Bachelor of Science in Engineering requires a minimum of 128 s.h. of credit. Students must have a g.p.a. of at least 2.00 on all college work used to satisfy degree requirements as well as on all work undertaken at the University of Iowa. The major in biomedical engineering builds on the foundation provided by the B.S.E. core requirements, preparing students for the challenges and opportunities associated with careers in the profession.

The program has been designed carefully to enable students to satisfy the entrance requirements of the Graduate College. Students whose choice of electives includes a three-course sequence in organic chemistry, an additional biology course, and a biochemistry course may satisfy entrance requirements of the Carver College of Medicine, the College of Dentistry, or the allied health sciences.

All engineering students complete the B.S.E. core requirements for the Bachelor of Science in Engineering. Biomedical engineering students must choose one of four preapproved focus areas—bioimaging, bioinformatics, biomechanics and biomaterials, or cellular engineering. Each focus area may be designated pre-medicine by taking the necessary focus area electives. Each approved focus area has a group of four required courses and a list of suggested electives.

Focus Areas

Bioimaging Focus Area

Bioimaging represents the acquisition, processing, and visualization of structural or functional images of living systems. Medical imaging and image processing are integral to the extraction of anatomical and biological information from the systems level down to the molecular level with the goal of clinically seeking to reveal, diagnose, or examine diseases, as well as to the study of normal anatomy and physiology.

Bioinformatics Focus Area

Bioinformatics is an interdisciplinary field that develops methods and software tools for modeling and understanding biological data and systems that are typically represented by large amounts of data. Bioinformatics is a combination of computer science, statistics, informatics, and engineering to analyze and interpret biological and genomic data. It is used for the identification of candidate genes to better understand the genetic basis of disease, unique adaptations, and differences between populations.

Biomechanics and Biomaterials Focus Area

Biomechanics is the study of structure and function. It is the application of principles from classical mechanics to problems in biological systems. This focus area emphasizes cardiovascular and/or musculoskeletal biomechanics. The study of biomaterials plays an important role in the design of implants and surgical instrumentation for both cardiovascular and musculoskeletal applications.

Cellular Engineering Focus Area

Cellular engineering involves the application of engineering principles to problems in cellular and molecular biology, particularly as they relate to human health. The goal of this focus area is to equip students with the quantitative tools necessary to understand, manipulate, and control cellular and subcellular processes for a range of biomedical applications, including those related to stem cells, tissue engineering, and regenerative medicine.

For details about focus areas and their requirements, visit biomedical engineering Focus Areas on the department's website.