

Choosing a Biomedical Engineering Concentration...

You must choose a concentration within the biomedical engineering program. Here is some information about each concentration to help you out. Many of the courses within the program are common to all three concentrations and you may decide to delay your choice of concentration until your sophomore year.

Biomechanical Engineering concentration:

Biomechanical engineering includes biomechanics and biomaterials. Biomechanics is the study of mechanical parameters, which drive living systems in motion. In a biomedical context, biomechanical engineers model organ and limb motion in order to design components that enhance or limit movement. Examples of applications in biomechanics include orthotics and prosthetics devices, orthopedic and dental implants, rehabilitation supports and devices, human-machine tele-operated devices, robotic limbs, cardiac pacing devices, and artificial tissue scaffolds. Biomaterials is the science of materials that are either taken from a biological sources or applied to biological systems. Examples of applications in biomaterials include novel drug delivery vehicles, organ and tissue engineering constructs, surgical adhesives, and coatings for medical devices to be compatible with the human body, as well as cardiovascular, orthopedic, dental, and ophthalmic grafts and implants.

Biochemical Engineering concentration:

Biochemical engineering is a branch of biomedical engineering that mainly deals with the design and construction of devices that involve biological organisms or molecules. It includes tissue engineering, and biomolecular engineering. Its applications are used in the pharmaceutical, biotechnology, and medical industries. Tissue engineering is a subdiscipline that involves the use of a combination of cells, engineering materials, and suitable biochemical factors to improve or replace biological functions in an effort to affect the advancement of medicine. Biomolecular engineering narrows the focus primarily to the molecular level, and to applications drawn specifically from biological and health-oriented fields. With the addition of Organic Chemistry II, the concentration in biochemical engineering provides all necessary courses for a pre-med program.

Bioelectronics Engineering concentration

Bioelectronics is the application of electronics or electrical properties to biological systems. Bioelectronics engineers build devices, or computer interfaces that respond to mechanical, electrical, magnetic, or acoustic signals generated from a biological, physiological, or human sources. Bioinstrumentation involves a very broad spectrum of disciplines, which include electrical engineering, optics, mechanical engineering, physics, computer science, organic chemistry, molecular biology, computational biology, and materials science. Technological breakthroughs in bioelectronics will benefit an innumerable number of medical applications. Current research applications include surgical devices, imaging, human-machine tele-operated devices, molecular motors, sub-atomic robots, bio-chips for drug and disease screening, cardiac monitoring and pacing devices, and hearing aids.