Biomedical Engineering

Biomedical Engineering is an emerging and rapidly expanding field where engineering and biological disciplines converge. According to the National Institutes of Health, biomedical engineering integrates physical, chemical, mathematical, and computational sciences with engineering principles to study biology, medicine, behavior and health. Biomedical engineers advance fundamental concepts and create knowledge from the molecular to the organ systems levels. They develop innovative biologies, materials, processes, implants, devices, and informatics approaches for the prevention, diagnosis, and treatment of disease, for patient rehabilitation and health improvement.

The outlook for biomedical engineers is incredibly promising. In May 2010, the Bureau of Labor Statistics identified Biomedical Engineering as the fastest-growing occupational field, with jobs over the next decade being expected to grow by 72%. Major categories of employment include medical equipment and supplies manufacturing, scientific research and development, and pharmaceutical and drug manufacturing.

Biomedical engineering is an attractive major for students with a wide range of scientific interests and lends itself to specialization at a later time. The broad scientific background of this curriculum prepares students not just for employment in biomedical engineering and related professions, but for entry into advanced studies, including medical school, engineering graduate school and other professional programs.

For more information, contact Michele Schwander, 125 East Delaware, 831-6234.

CAREER CAVEAT: ENGINEERING

Students in technical disciplines have the frequent tendency of inextricably linking their career possibilities with their academic major. They seldom realize that a major is largely an administratively convenient tool used by a college or university to categorize students.

There is not always an obvious parallel between your engineering major and an occupational field. In the same way that accountants are used as computer information systems analysts along with those having computer science backgrounds, engineers work in capacities other than hands-on engineering. In other words, just as a given job can be filled by individuals from a variety of academic backgrounds, individuals with the same major can qualify for many different jobs.

While it is uplifting to know that more career options are open to you as a technical major than you previously realized, it also poses the dilemma of identifying and narrowing down the appropriate options. To remedy this confusion, you should approach your career selection in terms of the types of functions you wish to perform within an organization. An example might be a biomedical engineer who determines that he/she would like to function in a sales or marketing capacity instead of a manufacturing role due to his/her interests, persuasive skills, and outgoing personality.

Job titles differ from industry to industry and company to company. Since job classifications are not standardized, determining your fit within a seemingly endless list
of titles can be very confusing and frustrating. Thus thinking of jobs in functional terms provides a way to organize these job titles that you will encounter in company literature and employment ads. Thinking in terms of functions will also allow you to clearly indicate to potential employers exactly what you want to do regardless of the job title.

SAMPLE CONCENTRATIONS

Technical electives in the Bachelor of Biomedical Engineering curriculum provide the students with an opportunity to pursue areas of particular interest. Due to the breadth of technical areas in which biomedical engineers work, the approved list of electives includes upper-level courses across departments. For example students may look for further expertise in the following focus areas:

**Bioimaging, Biomedical Computing, and Bioelectronics** includes biomedical signal and image processing, biomedical instrumentation, medical imaging modalities (including CT, MRI and ultrasound) for patient-specific modeling, modeling and analysis of biomedical data from a variety of sources, biomedical text mining, human-computer interaction systems, universal access design, biosensors and applications of nanotechnology to biomedicine.

**Biomechanics** applies experimental and computational approaches to explore biomechanical function across multiple scales including the molecule, cell, tissue, organ, and whole body.

**Biomolecular Engineering, Cellular Engineering and Systems Biology** study, model and modify biomolecules (including nucleic acids and proteins), cells, and the regulatory networks that control genetic, biochemical, cellular, and physiological functions.

**Neuroengineering** explores the neural control of posture and movement, brain-machine and other neural interfaces, biomimetics, motor learning & robotic training for rehabilitation, decision-making & artificial intelligence, and modeling of the neuromuscular system.

**Tissue Engineering, Biomaterials, and Drug Delivery** examines the application of biologically inspired and biologically produced materials for the delivery of therapeutic molecules, the understanding of cell biology and mechanotransduction, the repair of damaged tissues, and the creation of functional substitutes.

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**Enhancing Employability**

- Participate in Internships, Field Experience Placements and Alumni Mentor Network.
- Sample Field Experiences: Christiana Care Vest Center, and LifeCell.
Some Employers of Biomedical Engineering Majors

- medical equipment and supplies manufacturers
- biomedical supply companies
- medical supply companies
- medical technology companies
- pharmaceutical and drug companies
- health services
- hospitals
- patient rehabilitation facilities
- scientific research and development facilities
- federal and state government

Other Sources of Information

- American Association of Engineering Societies - www.aaes.org
- Biomedical Engineering Society - www.bmes.org
- EngineerJobs.com - www.engineerjobs.com
- EngineeringJobs.com - www.engineeringjobs.com
- Graduating Engineer Online - www.graduatingengineer.com
- Jobs in Engineering - www.JobsInEngineering.us
- My Perfect Gig (job listings) - www.myperfectgig.com
- National Society of Black Engineers - www.nsbe.org
- PhDs.org - www.phds.org
- Society of Women Engineers - societyofwomenengineers.swe.org
- The Riley Guide - www.rileyguide.com

Found at the Career Services Center's Career Library (first floor):

Blue Hen Careers -- Internships, Part-time, Summer, and Full-time Jobs -- All in one place

- Salaries of Scientists, Engineers & Technicians (CS 346)
- Careers for Scientific Types & Others With Inquiring Minds (CSE 457)
- Career Opportunities in Engineering (CSE 526)
- Is There an Engineer Inside You? (CSE 536)
- Careers in Engineering (CSE 536.5)
- Opportunities in Engineering Careers (CSE 537)
- Great Jobs for Engineering Majors (CSE 538)
- Careers in Focus - Engineering (CSE 539)
- www.udel.edu/CSC/netresources.html CSC's Internet Resources

Further information including: Skills to Develop, Strategies for Contacting Employers, Graduate School Information and where to get assistance is all available in the CAREER LIBRARY located at 401 Academy Street.