How Bioengineering relates to other disciplines

Bioengineering is not so much a new branch of engineering as an important part of the future of all engineering disciplines. As the human impact on the natural continues to increase, we must work towards a world where engineering and biology work together rather than occupying separate territories.

Many areas of modern chemical engineering exemplify this, such as the development of biofuels and naturally-derived plastics. This is just the beginning and soon the bio-engineering symbiosis will spread to all fields of engineering.

At the same time the role of engineering in medicine continues to increase rapidly. Sophisticated equipment enhances the skill of surgeons, better diagnostics supplement the experience of family practitioners, and we will count more and more on devices to keep us in good repair as well as free from disease.

Research Opportunities

Undergraduates are strongly encouraged to pursue research projects in our laboratories, such as:

- auxetic textiles for vascular stent/graft
- 3D gel structures with embedded cells for bioreactors
- strong fiber-reinforced gels for cartilage replacements
- printed bionic devices for the interface between the nervous system and electronics
- antioxidant protection of natural dyes
- flocked bioreactor to remove NH3 from aqua farm environment
- bioactive bandages
- bioconversion of CO2 to ethanol

For more information, please contact:
Department of Bioengineering (TEX 217)
University of Massachusetts Dartmouth
285 Old Westport Road
North Dartmouth, MA 02747-2300
508.999.8448
www.umassd.edu/engineering/bng
**What Bioengineers do**

- Support and develop medical imaging
- Develop new surgical devices and techniques
- Utilize biotechnology for biopharma drug production
- Study fermentation methods to make biofuels and biopolymers
- Engineer tissues to replace damaged organs and to grow human tissue for drug testing
- Create new diagnostic techniques
- Investigate biomaterials for prostheses applications

**Where Bioengineers work**

- hospitals
- bioresearch centers
- pharmaceutical laboratories
- prostheses and medical devices manufacturers
- biomaterial developers
- patent offices
- consulting business
- government regulatory agencies
- medical information software developers
- health management services
- care delivery system supporters

**Companies employing bioengineers in New England**

- Boston Scientific Corp.
- Genzyme Corp.
- Organogenesis Inc.
- Millipore Corp.
- Covidien
- Johnson & Johnson
- Abbott Laboratories
- Biogen Idec
- Novartis
- Pfizer
- Amgen
- Merck
- Medtronic, Inc.

**Undergraduate Program**

The undergraduate curriculum leading to a BS in Bioengineering provides students with:

- a fundamental understanding of mathematics and the natural, life and medical sciences
- knowledge of bioengineering principles and their applications in the life and medical sciences
- critical problem solving skills in bioengineering
- strong professionalism, teamwork, and communication abilities
- a broad education enabling diverse careers

**Bioengineering courses include**

- BNG 101 Introduction to Bioengineering
- BNG 311 Experimental Design & Analysis
- BNG 312 Biotransport
- BNG 313 Biomeasurement and control
- BNG 314 Biomechanics
- BNG 315 Biosystems Analysis & Design
- BNG 316 Biomaterials
- BNG 411 Bioengineering Laboratory
- EGR 497 & 498 Capstone Project I & II: Bioengineering

**Plus specialized courses in areas of interest**

- Biomaterials Engineering
- Biomedical Engineering
- Premed

The US Department of Labor “Overview of the 2008-18 Projections” reports that biomedical engineers’ job growth rate is the fastest at 72%. The national average starting salary for BS bioengineering graduates was $54,158 in 2009 according to the National Association of Colleges and Employers.