Biomedical Engineering

Biomedical engineering is a multi-disciplinary field that builds upon mathematics, physical sciences and chemical sciences; integrates engineering and life sciences; and is applied to wide-ranging issues in biology and medicine.

The biomedical engineering program in the Department of Biomedical Engineering educates engineers in both breadth and depth of biomedical engineering, with specific activities in the domains of bioimaging; biotransport; biomaterials; biomechanics; molecular, cellular and tissue engineering; and micro/nano-biotechnology. Students are challenged to integrate the engineering and life sciences throughout the curriculum, including quantification of physiological processes, modeling and computer simulation of biological phenomena.

Pursuing Biomedical Engineering at Ohio State

Students interested in biomedical engineering as a major should have a strong background in math, chemistry, biology, physics, and written and verbal communication. Students should have curiosity about how things work, the ability to work on a team and an interest in helping people.

Students may directly enroll as pre-engineering students; however, selection is competitive. Factors used to determine eligibility to directly enroll include ACT/SAT scores (emphasis on math), strong college prep curriculum (emphasis on math, science and rigorous courses), and class rank or GPA. The middle 50% of directly enrolled pre-majors for autumn 2014 had an ACT score range of 28–32 and 96 percent were in the top 25% of their high school classes. Students not eligible to directly enroll in engineering may enroll in Science, Technology and Environment Exploration (see exploration.osu.edu).

Admission to the biomedical engineering program may be possible after completing foundational sequences of courses in engineering, mathematics and science (separate application form available in the department). Before taking the first biomedical engineering core course, BME 2000 (Introduction to Biomedical Engineering), students must have completed Chemistry 1220, Mathematics 1172, Physics 1250 and Engineering 1182.

Students must be in good standing with a cumulative point-hour ratio (CPHR) of at least 2.0, but substantially higher achievement will be required for competitive applications to the program.

Program Educational Objectives

The mission of the Biomedical Engineering Department is to promote learning and discovery that integrates engineering and life sciences for the advancement of human health. To fulfill this mission at the undergraduate level, we have identified the overarching objective to provide educational opportunities for students to creatively integrate engineering and life sciences so that graduates can successfully pursue the following:

- Advanced study leading to research or professional practice in biomedical engineering
- Advanced study leading to research or professional practice in health care
- Careers in biomedical engineering industries or related technical and professional fields

The Student Outcomes supporting our Educational Objectives can be found at go.osu.edu/bme_outcomes.

Biomedical Engineering Requirements

College requirements for biomedical engineering:

- Chemical sciences (18 credit hours)
- Mathematics (14 credit hours)
- Statistics (3 credit hours)
- Physics (10 credit hours)
- Life sciences (11 credit hours)
- Engineering sciences (15 credit hours)
- Biomedical engineering core courses (30.5 credit hours)
- Technical engineering electives (6 credit hours)

Co-Curricular Opportunities

Ohio State offers many opportunities for students to learn and grow outside of the classroom. These range from cooperative education (co-op) and internships to study abroad programs to student organizations. Co-ops and internships place students in professional environments while they are Ohio State students. These experiences enable students to gain valuable work experience, learn about cultures, and take on leadership roles before they enter the workforce. All of these experiences enhance learning and may provide an advantage in the job market.

Honors & Scholars Programs

Ohio State offers the Honors and Scholars programs to create an environment of intellectual support and stimulation within a close-knit community of high-ability undergraduate students. Through these programs, students have access to smaller classes, undergraduate research opportunities, close working relationships with faculty, priority scheduling and unique housing options.

For more information, check these websites:

Biomedical Engineering: bme.osu.edu
College of Engineering: engineering.osu.edu
Ohio State: osu.edu
Admissions: undergrad.osu.edu
Multicultural Center: multiculturalcenter.osu.edu
First Year Experience Program: fye.osu.edu
Honors and Scholars programs represent great opportunities to be part of a smaller community within a large university. Learn more about the Honors and Scholars program at honors-scholars.osu.edu.

The College of Engineering encourages outstanding students to participate in honors activities. Honors students have multiple opportunities in the college such as participation in the Fundamentals of Engineering for Honors program, designation as an Honors student, Latin Honors at graduation, graduation with distinction, and graduation with honors in engineering. A variety of honorary societies are also available to qualified engineering students.

**Career Prospects in Biomedical Engineering**

Current hiring and long-term trends for biomedical engineering careers continue to have a positive outlook. According to the U.S. Bureau of Labor Statistics, the number of biomedical engineering jobs is predicted to increase by 27 percent between 2012 and 2022, a rate much faster than the average.

A majority of all biomedical engineers are employed by manufacturing industries, primarily in the medical instruments and supplies industries. Many pursue further professional training in medicine, dentistry, veterinary, law and business, or further their education in graduate school. Biomedical engineers find jobs in health services, government agencies or as independent consultants.

Newer areas of biomedical engineering are experiencing rapid growth, such as computer-assisted surgery and cellular/tissue engineering. In addition, the rehabilitation and orthopedic engineering specialties are growing, increasing the need for more biomedical engineers.

Starting salaries for graduates with a BS in biomedical engineering averaged $57,319 in 2014 (National Association of Colleges and Employers). Salaries are dependent upon candidates’ experience and skills.

**Curriculum Sample**

This is a sample list of classes a student will take to pursue a degree in biomedical engineering. Since university students need more than specific education in a narrow field, they also will take classes to complete General Education (GE) requirements. Because GE courses come from a variety of academic areas of study, this course work helps students develop fundamental skills essential to collegiate success and allows them to tailor these courses toward their interests.

Note: This sample represents one of several possible paths to a degree in biomedical engineering. Consult the departmental website, bme.osu.edu, for details on course options, specifically for technical engineering electives.

**Freshman Year:**
- Engineering survey: 1
- Chemistry: 10
- Introduction to Engineering: 4
- Math: 10
- Physics: 5
- GE courses: 3
  **Total hours**: 33

**Sophomore Year:**
- Life sciences: 8
- Chemical sciences: 4
- Engineering sciences: 10
- Biomedical engineering: 5
- Math: 4
- Physics: 5
  **Total hours**: 36

**Junior Year:**
- Biomedical engineering: 15.5
- Statistics: 3
- Chemical sciences: 4
- Life sciences: 3
- GE courses: 6
  **Total hours**: 31.5

**Senior Year:**
- Biomedical engineering: 10
- Technical engineering electives: 6
- GE courses: 15
  **Total hours**: 31

Ohio State’s biomedical engineering program is accredited by the Engineering Accreditation Commission of ABET, abet.org.

Revised July 2015. Information subject to change. For the most up-to-date information on the biomedical engineering program, visit bme.osu.edu.

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