

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 who come to Ohio State to study engineering that have a minimum ACT Math score of 24 or SAT Math score of 560 will be directly enrolled as pre-engineering students in the College of Engineering. Those not eligible to directly enroll in engineering may enroll in the Science and Technology Exploration Program that is part of the Exploration Program (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 202 (Introduction to Biomedical Engineering), students must have completed Chemistry 123, Mathematics 254, Physics 133, and Biology 113.

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

Biomedical Engineering Requirements

College requirements for biomedical engineering:

- Chemical sciences (25 credit hours)
- Mathematics (24 credit hours)
- Statistics (3 credit hours)
- Physics (15 credit hours)
- Life sciences (16 credit hours)
- Engineering sciences (26 credit hours)
- Biomedical engineering core courses (40 credit hours)
- Professional engineering electives (9 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

For more information, check these web sites:

Biomedical Engineering: www.bme.ohio-state.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

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 the General Education Curriculum (GEC). The GEC will allow students to develop the fundamental skills essential to collegiate success across major programs. Course work options satisfying the GEC often come from a variety of academic areas of study allowing students to tailor their GEC toward their interests. Note: This sample represents one of several possible paths to a degree in Biomedical Engineering. Consult the departmental web site, www.bme.ohio-state.edu, for details on course options, specifically for professional engineering electives.

Freshman Year*:

Chemistry	15
Introduction to Engineering	6
Math	15
Physics	10
GEC (First-year composition)	5
Engineering Survey	1
Total hours	52

Sophomore Year:

Life sciences	7
Chemical sciences	3
Engineering sciences	15
Biomedical engineering	5
Math	9
Physics	5
Statistics	3
GEC (2nd year writing course)	5
Total hours	52

Junior Year:

Biomedical engineering	18
Engineering sciences	4
Chemical sciences	7
Life sciences	9
GEC (Social Sciences)	10
Total hours	48

Senior Year:

Biomedical engineering	17
Professional engineering electives	9
GEC (Historical Survey)	5
GEC (Arts & Humanities)	5
GEC (Ethics)	15
Total hours	41

have access to smaller classes, undergraduate research opportunities, close working relationships with faculty, priority scheduling, and unique housing options.

Honors and Scholars programs represent great opportunities to be part of a smaller community within a large university. Good candidates for these programs will receive additional information after admission to the 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 a 2008–2009 U.S. Department of Labor Statistics report, growth of biomedical engineering jobs is predicted to be 21 percent from 2006 to 2016, about double the average job growth prediction.

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 \$51,110 in 2007. Salaries are dependant upon candidates' experience and skills.

Revised September 2009. For the most up-to-date information on the biomedical engineering program, visit www.bme.ohio-state.edu.

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