

# Biomedical Engineering

## About Biomedical Engineering

Biomedical engineering is an interdisciplinary field in which the concepts, methods and techniques of engineering are applied to solving problems in biology and medicine. It applies quantitative, analytical and integrative methods from the molecular level to that of the whole organism to further our understanding of basic biological processes and to develop innovative approaches for the prevention, diagnosis and treatment of disease.

A student majoring in biomedical engineering will have the opportunity to participate in the world-class research activities of engineering and medical faculty in biomaterials, imaging, cardiovascular engineering, cell and tissue engineering, molecular cellular and systems engineering, neural engineering, regenerative engineering, and women's health technologies. All students in biomedical engineering are encouraged to join and be active in the Biomedical Engineering Society (<https://www.bmes.org/>).

## Mission Statement

Our departmental mission is to serve society as a center for learning and knowledge creation in engineering and science for the purpose of advancing biology and medicine.

Our overall educational objective is to prepare those receiving a bachelor's degree in biomedical engineering for a variety of career paths. To that end, our undergraduate curriculum is designed to provide technical proficiency as well as communication and other professional skills so that our graduates will be able to do the following:

- Pursue careers in the biomedical engineering industry or related fields
- Undertake advanced study (e.g., MS, PhD) in biomedical engineering or a related field in preparation for careers utilizing this further training
- Complete professional degrees (e.g., in medicine, dentistry, law or business) in preparation for careers utilizing those degrees

## Academic Programs

The Bachelor of Science in Biomedical Engineering (BS-BME) is designed to prepare graduates for the practice of engineering at a professional level. It is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>).

The curriculum is structured around a basic core of 80 credits. In addition, a complementary set of courses totaling at least 40 credits completes the degree requirements.

To satisfy ABET (<http://www.abet.org>) requirements, all professional engineering curricula at the baccalaureate level must include the equivalent of one and one-half years of engineering topics, including engineering sciences and engineering design appropriate

to biomedical engineering. The BS-BME degree at Washington University requires 47 credits of engineering topics. The basic core curriculum includes 32 engineering topics credits. Therefore, students pursuing a BS-BME degree will need 15 additional engineering topics credits beyond the basic core curriculum. They also may receive up to 6 credits of academic credit for a research or design project by registering for BME 400, BME 400A, BME 400B or BME 400C Independent Study. In addition, their course program must include sufficient laboratory experience to ensure competence in experimental design, data collection and data analysis. For more information regarding engineering topics credit requirements, please refer to the Undergraduate Curriculum (<http://bme.wustl.edu/undergraduate/pages/undergraduate-curriculum.aspx>) webpage.

## Bachelor's/Master's (BS/MS) Program in Engineering

The BS/MS program allows current BME undergraduate students to earn a master's degree with only one additional year of study. Interested engineering students should discuss the program with their BME academic and Engineering Undergraduate Student Services advisors by the end of their junior year in order to best develop a plan for their senior year leading into their master's year. With advisor and departmental approval, up to 6 graduate-level credits can be shared between the BS and MS degrees; however, the combined program still requires students to complete a minimum of 144 units in total.

## Double Majors

An option available to students majoring in biomedical engineering is the double major, which leads to a second professional BS degree in one of the other engineering disciplines in four years. A BME degree in combination with a professional degree in one of the traditional engineering disciplines can be expected to enhance employment options in industry. Depending upon the second major chosen, total unit requirements may range from 140 to 148 (or less if the student enters with advanced placement credits). Hence, some summer work may be necessary in order to complete a double major within four academic years. To determine the specific requirements to be satisfied for both degrees, students are urged to consult with an advisor in the second department as early as possible.

## Premedical Preparation

Training in BME is also excellent preparation for various professional schools, particularly medical schools. Many students complete their premedical requirements while obtaining their BME degrees. Premedical preparation is not a major; rather, it allows students to fulfill the requirements needed for entry to medical school. Further information can be obtained by visiting the Premedice (<https://engineering.wustl.edu/current-students/student-services/Pages/premedicine.aspx>) webpage and by contacting the McKelvey School of Engineering's Health Professions Advisor, Jessica Allen, at [jessicaa@wustl.edu](mailto:jessicaa@wustl.edu).

## Cooperative Experience

Cooperative experience is available to upper-level students at numerous life science/technology companies both in the St. Louis area and nationwide. This experience is particularly valuable for students who wish to enter industry. However, since most companies ask that students spend the equivalent of one semester and a summer participating in these experiences, it may be difficult to complete the degree requirements in eight semesters, unless students enter with sufficient advanced placement credits and/or take summer courses.

*Please visit our website for the most current and up-to-date information.*

Phone: 314-935-7208

Website: <https://bme.wustl.edu/academics/undergraduate-programs/index.html>