BME Master of Engineering

Engineers who understand biology and medicine and who can apply their knowledge and skills to improve human health are increasingly in demand. A professional degree in Biomedical Engineering (BME) will prepare students to fill this increasingly critical need.

Educational Goal

The Master of Engineering program prepares students for professional practice in BME. Students will acquire a broad perspective of the biomedical engineering discipline that complements their undergraduate training in engineering or science and an in-depth knowledge of an essential area in biomedical engineering. Graduates will be equipped to design biomedical devices and develop therapeutic strategies within the bounds of health care economics, the needs of patients and physicians, the medical device regulatory environment and the ethical standards of biomedical engineering practice.

Curriculum Requirements

A total of 30 credits is required for the master of engineering degree and typical students with a B.S. in an engineering discipline require two semesters to complete the program. All students must complete the following:

- BME 5500, Product Engineering and Design in Biomedical Engineering, 3 credits
- BME 5910, Preliminary Study for Design Project, 2 credits
- BME 5920, Performance of Design Project, 4 credits
- Biomedical Engineering Graduate Concentration, 12 credits minimum

Students must choose one of the three areas below as an area of concentration and demonstrate knowledge in the other two:

- Biomedical Mechanics and Materials
- Bioinstrumentation and Imaging
- Drug Delivery and Cellular/Tissue Engineering
The remaining credits can be from engineering, science, and business courses. Students are expected to have working knowledge of molecular and cellular-based biomedical engineering and engineering analysis of physiological systems when they enter the program; however, courses are available to make up missing course work during the M.Eng. program. The precise program requirements must be agreed upon by the student and the M.Eng. faculty coordinator.

**M.Eng Design Project**

The M.Eng. project is a six-credit project done over two terms. Students may work in teams. Emphasis is on design and typically involves an economic evaluation of a process or product. Projects may be generated by BME faculty, industrial colleagues, or clinicians in Cornell’s medical or veterinary colleges. While the project is often a “paper” study, it may involve laboratory exploration of a new idea, development of a prototype of a device, production of CAD drawings, or design of a process. The project may focus on design of processes, devices and developing novel laboratory instruments. Examples of projects accomplished by students include:

- Mechanobiological factors shaping the evolution of the vertebrate heart with Professor Jonathan Butcher
- Living inks for 3-D tissue printing with Professor Lawrence Bonassar
- New product development project, with Welch-Allyn, under the direction of Mr. Jack Thompson ’73, Senior Lecturer
- In vitro simulation and evaluation of total hip replacement component insertion by Professor Jonathan Black
- Infant respiratory monitor for global health by Dr. William Frayer and Mr. Jack Thompson, ’73 Senior Lecturer
- Design of motion control and optical tracking systems for focal cancer ablation by Mr. John Cheesborough, III and Mr. Jack Thompson, ’73 Senior Lecturer

Students are encouraged to select a project by mid-September and work on it over the course of two terms, although it is possible to complete the project in a single semester.