BME Master of Engineering
“Excellence in professional biomedical engineering education.”

Educational Goal
The Master of Engineering program prepares students for professional practice in the Biomedical Engineering field. 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 professional leadership 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.

Program Mission
To form professional engineers capable of:
• Identifying, screening, and validating unmet clinical needs.
• Addressing these needs by inventing, designing, developing, and deploying innovative and value based technologies.

Common Objectives
Students enter the program with many different strengths and backgrounds and they will pursue many different potential career pathways. With that in mind, we have devised a curriculum that is rich and flexible while providing a well-defined and bounded process.

Independently of our student’s career goals, we have a few concurrent objectives:
• Provide a better understanding of the many different facets and dynamics of the healthcare industry.
• Expand and deepen technical and scientific knowledge within our student’s areas of interest and focus.
• Develop professional acumen.
• Provide the opportunity to work on real life and current design challenge.
Curriculum Requirements

A total of 30 credits are required for graduating with 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 – Innovation and Design of Biomedical Technologies (3 credits). The course addresses the clinical, business, regulatory, and technical challenges throughout the many phases of a medical technology product life cycle.

BME 5010 - Professional Engagement Seminars (fall and spring - 1+1 credits). The course gives students the opportunity to meet and hear from speakers representing the many different segments of healthcare related industry, clinical institutions, and academia.

Career Path Specific (25 credits)

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<th>Professional</th>
<th>Academia</th>
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<tr>
<td>Design Project (6 credits)</td>
<td>Research Project (6 credits)</td>
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<td>BME 5911-Preliminary Study for Design Project (2 credits)</td>
<td>BME 5910-Preliminary Study for Research Project (2 credits)</td>
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<td>BME 5921-Performance of Design Project (4 credits)</td>
<td>BME 5920-Performance of Research Project (4 credits)</td>
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Technical Core (12 credits)

Supplement technical backgrounds in:
- Biology
- Medicine
- Engineering

Provide industry specific technical and professional skills
- Devices
- Biotechnology
- Pharmaceutical

Professional Development (7 credits)

More Information:
Please contact Belinda Floyd, bh42@cornell.edu, 607-255-2573.

M.Eng. Design Project

The BME M.Eng. design projects are in line with the two available pathways.

Professional: The projects in this pathway are performed in teams over two terms. Emphasis is given on the identification and/or validation of unmet clinical needs while looking into the core problem, affected population, and desired outcomes. The teams are also required to engineer an innovative and value-based fully functional prototype addressing the defined need. At every academic year cycle we work towards the selection of sponsors and projects that are diverse, challenging, and aligned with our educational goals and industry segments.

Academic: The projects in this pathway are individual projects in which the students will apply to the many different laboratories and will be working on research projects under the purview of the principal investigator (PI).

Clinical Sponsor Projects

These projects are sponsored by clinicians with a field of specialty and/or with ideas of potential needs. We work closely with Weill Cornell Medicine, Cornell Veterinary Medicine, and Guthrie Robert Packer Hospital. Some examples are:
- Challenges in Minimally Invasive, Neurological, and Ophthalmological Surgery
- Advancements in Cardiac Assist Technology
- Peripheral Nerve Regeneration
- Delivery of Injectable Patches for Intervertebral Disc Repair
- Diagnose, Evaluate, and Treat Functional Muscle Pain

Industry Sponsored Projects

These projects are sponsored by industry partners with the objective of exploring a field of application and/or an already identified needs. The student teams work closely with their “customers” but maintain a certain level of independence as they analyze and validate the need as well as define the solution requirements and implementation of solutions. We work with many different companies including:
- Welch Allyn – Hill-Rom
- West Pharmaceutical
- Johnson & Johnson

Research laboratory sponsored projects

These projects are sponsored by principal investigators within the Cornell family and the objective is to support their research effort by devising and implementing novelty instrumentation and well as lab-to-product translation. Some examples are:
- Portable handheld device for real-time detection and treatment of premature birth risk
- Microfluidic Instrument version of a micropipette aspiration assay
- Device to aid diabetic wound healing

Community outreach and humanitarian projects

These projects are sponsored by members of our regional community and/or driven by humanitarian reasons. Some examples are:
- Intelligent and Adaptive Orthopedic Brace for Haleigh
- TEchoLocation – Combining technologies to help the visual impaired in under developed populations
- Strategies for Improving Prevention of Mother-to-Child Transmission (PMTCT) of HIV

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www.bme.cornell.edu