Erik Jonsson School of Engineering & Computer Science

Department of Bioengineering

Department Faculty

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Objectives

The MS and PhD programs in Biomedical Engineering at UT Dallas are offered as a part of a unique tri-campus program, encompassing UT Southwestern Medical Center and UT Arlington. The objective of the PhD Program in Biomedical Engineering (BME) is to train the next generation of leaders in the field through high-quality original research work, supplemented as appropriate by a broad range of interdisciplinary courses.

The new generation of biomedical engineers will address fundamental scientific questions, provide answers to critical problems, and develop novel applications with commercial potential. The opportunities for interdisciplinary research and coursework in several branches of engineering, coupled with the life sciences, will prepare the graduates of this program to tackle complex life sciences-related problems in novel ways and to create vital solutions for the future.

The objective of the MS degree program in Biomedical Engineering is to generate BME graduates who will be capable of undertaking challenging BME-related projects. The primary educational objective of the MS program is to expose students to the latest developments in biomedicine and to provide them with the appropriate tools to understand and contribute further to these developments. The MS degree program will provide the necessary education and immediately applicable skills that will enable both recent baccalaureate graduates and experienced biomedical engineers to develop new life science related technologies and applications.

Facilities

The Engineering and Computer Science Building and the new Natural Science and Engineering Research Laboratory provide extensive wet lab, fabrication, instrumentation, and high performance computing facilities to foster biomedical engineering and nano-technology research. A Class 10000 microelectronics clean room facility, including e-beam lithography, sputter deposition, PECVD, LPCVD, etch, ash and
evaporation, is available for student projects and research. In addition to the facilities on campus, students in this program will also have an opportunity to work closely with researchers in the UT Southwestern Medical Center and UT Arlington.

Master of Science in Biomedical Engineering

33 hours minimum

Admission Requirements

The University's general admission requirements are discussed on the Graduate Admission page (catalog.utdallas.edu/2013/graduate/admission).

A student lacking undergraduate prerequisites for graduate courses in Biomedical Engineering (BME) must complete these prerequisites or receive approval from the graduate advisor and the course instructor.

The student entering the MS BME program should meet the following guidelines:

- Undergraduate preparation equivalent to a baccalaureate in a field of engineering or the sciences
- A grade-point average in upper-division quantitative coursework of 3.25 or better on a 4-point scale
- GRE revised scores of 154, 156, and 4 for the verbal, quantitative, and analytical writing components, respectively, are advisable based on our experience with student success in the program. (See also UT Dallas requirements for English proficiency).

Applicants must submit three letters of recommendation, from individuals who are able to judge the candidate's probability of success in pursuing a program of study leading to the master's degree. Applicants must also submit an essay or "Statement of Purpose," outlining the candidate's background, education, and professional goals.

Degree Requirements

The University's general degree requirements are discussed on the Graduate Policies and Procedures page (catalog.utdallas.edu/2013/graduate/policies/policy).

The MS BME requires the completion of a minimum of 33 semester hours.

For the MS BME program, all students must:

Pass at least 2 of the following three core courses with a grade of B- or better

- **BMEN 6373** Anatomy and Human Physiology for Engineers
- **BMEN 6374** (EEBM 6374) Genes, Proteins and Cell Biology for Engineers
- **BMEN 6375** Techniques in Cell and Molecular Biology

Pass at least 2 of the following four core courses with a grade of B-
or better

**BMEN 6351** Biomedical Microdevices

**BMEN 6385** Biomedical Signals and Systems

**BMEN 6386** Biological Processes: Modeling and Simulation

**BMEN 6387** Applied Bioinformatics

Complete a minimum of 9 credit hours from the recommended electives. The remaining credits can be selected from 6000-level courses offered by the Erik Jonsson School, or the Biology Department, or by UTSW and UTA.

The MS BME program has both a thesis and a non-thesis option. All part-time MS BME students will be assigned initially to the non-thesis option. Those wishing to elect the thesis option may do so by obtaining the approval of a faculty thesis supervisor. Research and thesis hours cannot be counted in an MS BME degree plan unless a thesis is written and successfully defended.

Students must achieve an overall GPA of 3.0 or better, a GPA of 3.0 or better in their core MS BME classes, and a grade of B- or better in all their core MS BME classes in order to satisfy their degree requirements.

All full-time, supported students are required to participate in the thesis option. All students must have an academic advisor and an approved degree plan.

**Doctor of Philosophy in Biomedical Engineering**

*75 hours minimum beyond the baccalaureate degree*

**Admission Requirements**

The University's general admission requirements are discussed on the [Graduate Admission](catalog.utdallas.edu/2013/graduate/admission) page.

The PhD in Biomedical Engineering is awarded primarily to acknowledge the student's success in an original research project, the description of which is a significant contribution to the literature of the discipline. Applicants for the doctoral program are therefore selected by the Biomedical Engineering Program Graduate Committee on the basis of research aptitude, as well as academic record. Applications for the doctoral program are considered on an individual basis.

The following are guidelines for admission to the PhD program in Biomedical Engineering:

- A master's degree in engineering or one of the natural sciences from an accredited U.S. institution, or from an acceptable foreign university. However, consideration will be given to highly qualified students who wish to pursue the doctorate without satisfying all of the requirements for a master's degree.
• A grade point average in graduate coursework of 3.5 or better on a 4-point scale.
• GRE revised scores of 154, 156, and 4 for the verbal, quantitative, and analytical writing components, respectively, are advisable based on our experience with student success in the program. (See also UT Dallas requirements for English proficiency).

Applicants must submit three letters of recommendation, either on official school or business letterhead or using the UT Dallas Letter of Recommendation Form. Individuals who should provide recommendation letters are persons familiar with the student's record, who are able to judge the candidate's probability of success in pursuing doctoral study in biomedical engineering.

Applicants must also submit a narrative, describing motivation for doctoral study and how it relates to their professional goals.

For students who are interested in a PhD but are unable to attend school full-time, there is a part-time option. The guidelines for admission to the program and the degree requirements are the same as for full-time PhD students.

All students must have an academic advisor and an approved plan of study.

Degree Requirements

The University's general degree requirements are discussed on the Graduate Policies and Procedures page (catalog.utdallas.edu/2013/graduate/policies/policy).

Each program for doctoral study is individually tailored to the student's background and research objectives by the student's supervisory committee. The program will require a minimum of 75 semester credit hours beyond the baccalaureate degree. These credits must include at least 27 semester hours of graduate level courses beyond the baccalaureate level. All PhD students must demonstrate competence in the master's level core courses in their research area. All students must have an academic advisor and an approved plan of study. Qualified students may request waivers on core courses from their supervisory committee.

Also required are:

• Written qualifying exams (QE), covering both BIOLOGY CORE and ENGINEERING CORE topics, as well as a research-oriented oral QE presentation. Both the written and oral exams should demonstrate competence in the PhD candidate's research area. A student must make an oral presentation based on a review of 2 to 4 papers, followed by a question-answer session. A student entering the PhD program with an MS BME must pass this exam within 3 long semesters, and a student entering without an MS BME must pass this exam within 4 long semesters. A student has at most two attempts at this qualifying exam. The exam will be given during the fall and spring semesters.

• A comprehensive exam consisting of: a written dissertation proposal, a public seminar, and a private oral examination conducted by the PhD candidate's supervising committee.

• Completion of a major research project culminating in a dissertation, demonstrating an original contribution to scientific knowledge and engineering practice. The dissertation will be defended publicly. The rules for this defense are specified by the Office of the Dean of Graduate Studies. Neither a foreign language nor a minor is required for the PhD. However, the student's supervisory committee may impose these or other requirements that it feels are necessary and appropriate to the
student's degree program.