

Erik Jonsson School of Engineering and Computer Science

Department of Bioengineering

Objectives

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 address complex life sciences-related problems in novel ways and to create vital solutions for the future.

The objective of the PhD Program in Biomedical Engineering (BMEN) 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 objective of the MS degree program in Biomedical Engineering is to generate BMEN graduates who will be capable of undertaking challenging BMEN-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.

A unique joint program with UT Southwestern Medical Center is available for master's (MS) and doctoral (PhD) students in Biomedical Engineering at UT Dallas. Please contact your graduate advisor for further information.

Facilities

The Engineering and Computer Science Building, the Natural Science and Engineering Research Laboratory and the Bioengineering Science Building 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.

Master of Science in Biomedical Engineering

33 semester credit hours minimum

Department Faculty

FACG> ecs-biomedical-engineering-ms

Professors: Orlando Auciello, Leonidas Bleris, Stuart Cogan, Baowei Fei, Stephen D. Levene, Joseph Pancrazio, Shalini Prasad, David Schmidtke

Associate Professors: Heather Hayenga, Seth Hays, Brian Kim, Kristin Miller, Danieli Rodrigues, Shashank Sirsi, Victor Varner

Assistant Professors: Chen Cao, Yichen Ding, Polimyr Dingal, Xu Feng, Jacopo Ferruzzi, Yongsheng Gao, Caroline Jones, Gu Eon Kang, You Li, Eric Meyers, Girgis Obaid

Professors-of-Instruction: Tariq Ali, Clark A. Meyer

Associate Professors of Instruction: Kathleen Myers, Benjamin Porter

Assistant Professors of Instruction: Fang Bian, Katherine Brown, Levi Good, Christian Rivera, Rafiul Shihab

Professor of Practice: Todd W. Polk

UT Dallas Affiliated Faculty: Dinesh Bhatia, Carlos Busso-Recabarren, Xianming Dai, Crystal Engineer, Jeremiah J. Gassensmith, John Hart Jr., Fatemeh Hassanipour, Michael P. Kilgard, David J. Lary, Lloyd Lumata, Faruck Morcos, Issa M. S. Panahi, Balakrishnan Prabhakaran, Zhenpeng Qin, Bart Rypma, Mihaela C. Stefan, Yonas Tadesse, Lakshman Tamil, Jie Zheng

NOTE> Please be advised, the admissions section below feeds in from a separate page. Any changes made to the admissions section below will not be retained. Please contact catalog@utdallas.edu with any questions.

Admission Requirements

The University's general admission requirements are discussed on the [Graduate Admission](#) page.

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

The student entering the MS BMEN program should meet the following qualification guidelines:

- Undergraduate preparation equivalent to a baccalaureate in a field of engineering or the sciences
- A grade point average (GPA) in upper-division quantitative coursework of 3.00 or better on a 4.0 point scale
- See also UT Dallas requirements for [English proficiency](#).

Applicants must submit an essay or "Statement of Purpose" outlining their background, education, and professional goals. Additionally, three letters of recommendation from individuals who are able to judge the candidate's probability of success in pursuing the program of study leading to the master's degree are required. Letters may be submitted by recommenders on official school or business letterhead in sealed envelopes or by using the electronic UT Dallas Letter of Recommendation Form available on the UT Dallas Graduate Application for Admission.

Degree Requirements

The University's general degree requirements are discussed on the [Graduate Policies and Procedures](#) page.

The MS BMEN requires the completion of a minimum of 33 semester credit hours at the graduate level, and 24 semester credit hours must be BMEN or BMEN cross-listed courses. Students must complete the BMEN core which consists of 12 semester credit hours chosen from the following BMEN core courses.

[BMEN 6342](#) Biomaterials and Medical Devices

[BMEN 6345](#) Self-Assembly of Biomaterials

[BMEN 6351](#) Biomedical Microdevices

[BMEN 6355](#) ([MSEN 6355](#)) Nanotechnology and Sensors

[BMEN 6372](#) Engineering Systems: Modeling and Simulation

[BMEN 6373](#) ([EEBM 6373](#)) Physiology and Immunology for Engineers

[BMEN 6374](#) ([EEBM 6374](#)) Genes, Proteins and Cell Biology for Engineers

[BMEN 6382](#) Systems Biology

The remaining 9 semester credit hours beyond the 24 semester credit hours of BMEN or BMEN cross-listed courses can be satisfied by completing recommended electives. These credits can be selected from 6000-level courses offered by the Erik Jonsson School of Engineering and Computer Science, the Department of Biological Sciences in the School of Natural Sciences and Mathematics, or appropriate graduate level courses taught at UT Southwestern. Students must obtain departmental approval to enroll in BMEN or non-BMEN technical skills courses, and students may take no more than 12 semester credit hours of technical skills courses for the Master's degree.

The MS BMEN program offers both thesis and non-thesis options. All MS BMEN students will be assigned initially to the non-thesis option. Those students who elect the thesis option may do so by obtaining the approval of a faculty thesis supervisor. Research and thesis semester credit hours cannot be counted in an MS BMEN degree plan unless a thesis is written and successfully defended.

- In order to satisfy degree requirements, students must achieve an overall GPA of 3.00 or better.
- Students must obtain a GPA of 3.33 or better in all MS BMEN or BMEN cross-listed core courses.
- To be considered for admission to the PhD program, one must obtain an overall graduate GPA of 3.33.

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

Doctor of Philosophy in Biomedical Engineering

75 semester credit hours minimum beyond the baccalaureate degree

Department Faculty

FACG> ecs-biomedical-engineering-phd

Professors: Orlando Auciello, Leonidas Bleris, Stuart Cogan, Baowei Fei, Stephen D. Levene, Joseph Pancrazio, Shalini Prasad, David Schmidtke

Associate Professors: Heather Hayenga, Seth Hays, Brian Kim, Kristin Miller, Danieli Rodrigues, Shashank Sirsi, Victor Varner

Assistant Professors: Chen Cao, Yichen Ding, Polimyr Dingal, Xu Feng, Jacopo Ferruzzi, Yongsheng Gao, Caroline Jones, Gu Eon Kang, You Li, Eric Meyers, Girgis Obaid

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Admission Requirements

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The PhD in Biomedical Engineering (BMEN) 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:

- Bachelor's or master's degree in engineering or one of the natural sciences.
- A grade point average in graduate coursework of 3.33 or better on a 4.0 point scale.
- Students admitted to the program without a master's degree are required to take a minimum of 33 semester credit hours of organized coursework. A minimum of 24 semester credit hours must consist of BMEN or BMEN cross-listed courses.
- An overall grade point average of 3.33 or better on a 4.0 point scale for students entering without a master's degree.
- See also UT Dallas requirements for [English proficiency](#).

Applicants must submit an essay or Statement of Purpose describing motivation for doctoral study and how it relates to their professional goals, area of research interest, and potential supervising professor. Students are encouraged to directly contact faculty about research opportunities and their willingness to serve as their supervising professor.

Three letters of recommendation from individuals who are familiar with the student's record and are able to competently judge the candidate's probability of success in pursuing doctoral study in biomedical engineering are required. Letters may be submitted by recommenders on official school or business letterhead in sealed envelopes or by using the electronic UT Dallas Letter of Recommendation Form available on the UT Dallas Graduate Application for Admission.

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 a supervising professor and an approved plan of study.

Degree Requirements

The University's general degree requirements are discussed on the [Graduate Policies and Procedures](#) page.

Each program for doctoral study is individually tailored to the student's background and research objectives by the student's dissertation committee.

The PhD degree requires a minimum of 75 semester credit hours beyond the baccalaureate degree. Required courses for the Ph.D. program include:

[BMEN 7188](#) Advanced Seminars in Biomedical Engineering¹

[BMEN 8188](#) Advanced Seminars in Biomedical Engineering III

[BMEN 7340](#) Experimental Methods and Statistical Analysis

[BMEN 7387](#) Independent Scientific Research in Biomedical Engineering

[BMEN 7088](#) Departmental Seminar in Biomedical Engineering²

The dissertation committee or supervising professor can require additional courses. Neither a foreign language nor a minor is required for the Ph.D.

All students entering the Ph.D. program with a master's degree must complete a minimum of 9 semester credit hours of BMEN or BMEN cross-listed graduate-level courses with an overall 3.33 GPA or higher. Students admitted to the Ph.D. program without a master's degree must complete a minimum of 33 semester credit hours, and 24 semester credit hours must be BMEN or BMEN cross-listed courses. An overall GPA of 3.33 GPA or higher is required.

Students are required to have a supervising professor upon entry to the Ph.D. program and to develop an approved plan of study during the first long semester.

Also required are:

- A qualifying examination (QE) to demonstrate competence in the PhD candidate's research area. Admission to PhD candidacy is based on two criteria: graded performance in the QE and GPA in graduate-level organized courses. All students entering the PhD program must pass the QE within 2 long semesters. A student has at most two attempts to pass the QE which is given once during each fall and spring semesters.
- Formation of the Dissertation Committee upon successful completion of the qualifying exam. The Dissertation Committee must be formally approved by the department head and the Office of the Dean of Graduate Education.
- A written dissertation proposal and defense of the dissertation proposal. After the student's Dissertation Committee is formally approved, the student submits a written dissertation proposal to the Dissertation Committee. After the proposal is approved by the Dissertation

Committee, the student defends the dissertation proposal. A student has at most two attempts to successfully complete the dissertation proposal defense.

- Completion of a major research project culminating in a dissertation, demonstrating an original contribution to scientific knowledge and engineering practice. The dissertation is defended publicly. The rules for this defense are specified by the Office of Graduate Studies.

1. BMEN 7188 is to be taken two times in the first and second long semesters in the doctoral program.

2. BMEN 7088 is to be taken in the third long semester and each subsequent semester until graduation.

Certificates

Graduate Certificate in Health Data Analytics

9 semester credit hours

The Department of Biomedical Engineering offers a Graduate Certificate in Health Data Analytics that includes focuses in biostatistics, machine learning, statistical learning, and deep learning of health data.

Admission Requirements

- Bachelor's degree in Engineering or Computer Science with a GPA of 3.0
- A course background of at least 2 semesters of Calculus and 1 semester of Biology

Certificate Requirements

Students must complete the following three courses:

[BMEN 6367](#) Artificial Intelligence in Biomedical Engineering

[BMEN 6V87](#) Special Topics in Biomedical Engineering (when topic is "Introduction to Machine Learning in Biomedical Engineering")

[BMEN 6V87](#) Special Topics in Biomedical Engineering (when topic is "Data Science in Digital Health")

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