

# BIOMEDICAL ENGINEERING, PHD

**More Information:** <https://engineering.case.edu/ebme/>

**Degree:** Doctor of Philosophy (PhD)

**Field of Study:** Biomedical Engineering

## Program Overview

The objective of the PhD program in biomedical engineering is to educate biomedical engineers for careers in industry, academia, health care, and government and to advance research in biomedical engineering. The department provides a learning environment that encourages students to apply biomedical engineering methods to advance basic scientific discovery; integrate knowledge across the spectrum from basic cellular and molecular biology through tissue, organ, and whole-body physiology and pathophysiology; and to exploit this knowledge to design diagnostic and therapeutic technologies that improve human health. The unique and rich medical, science, and engineering environment at Case enables research projects ranging from basic science through engineering design and clinical application.

Numerous fellowships and research assistantships are available to support graduate students in their studies.

## Graduate Policies

For graduate policies and procedures, please review the School of Graduate Studies section of the General Bulletin.

## Program Requirements

The PhD program requires a minimum of 36 credit hours of courses beyond the BS degree. A student's overall Program of Study must clearly demonstrate adequate depth in a field of biomedical engineering relevant to the student's research area. There are 14 credit hours of required core courses. The program requirements include the following:

Code	Title	Hours
<b>Required Core Courses</b>		
EBME 400	Principles of Physiology	1
EBME 401D	Biomedical Instrumentation and Signal Processing	3
EBME 434	Methodologies for Modeling Physiological Systems	2
EBME 435	Advanced Topics of Compartmental Modeling	1
or EBME 436	Neuromuscular Physiology and Analysis	
EBME 570	Graduate Professional Development for Biomedical Engineers	1
EBME 454	Introduction to Grant and Fellowship Writing	1
EBME 515	Grant Writing II	2
IBMS 453	Cell Biology I	3
or EBME 451	Molecular and Cellular Physiology	
<b>Required Breadth Courses</b>		
<i>Two semesters of:</i>		
EBME 611	BME Departmental Seminar I	.5
or EBME 612	BME Departmental Seminar II	

*Two semesters of:*

EBME 613	Topic Seminars for NeuroEngineering Students	.5
EBME 614	Topic Seminars for NeuroEngineering Students	.5
EBME 615	Topic Seminars for Imaging Students	.5
EBME 616	Topic Seminars for Imaging Students	.5
EBME 617	Topic Seminars for Biomaterials Students	.5
EBME 618	Topic Seminars for Biomaterials Students	.5
EBME 619	Topic Seminars for Miscellaneous Biomedical Engineering Students	.5
EBME 620	Topic Seminars for Miscellaneous Biomedical Engineering Students	.5
<i>Three semesters of teaching experience:</i>		
EBME 400T	Graduate Teaching I	
EBME 500T	Graduate Teaching II	
EBME 600T	Graduate Teaching III	

The remaining courses can be chosen with significant flexibility to meet the career goals of the student and to satisfy the departmental requirements of depth and breadth. Programs of study must include one graduate level course in biomedical sciences and one course whose content is primarily mathematical, in addition to at least two courses with significant engineering content. More details on these requirements and accepted depth and breadth courses can be found in the Department of Biomedical Engineering's Graduate Education Committee Handbook. 18 credit hours of EBME 701 are also required. PhD programs of study are reviewed and must be accepted by the Graduate Education Committee, the department chair, and the School of Graduate Studies.

## Dual Degree Options

- Biomedical Engineering (MSTP), PhD/Medicine, MD (Medical Scientist Training Program)