

# PH.D. IN ENGINEERING (BIOENGINEERING)

## OVERVIEW

The doctoral program in engineering (bioengineering) is a research-intensive program supported by internationally-recognized faculty with expertise covering a wide range of specialized fields in bio-related applications. Students in the doctoral program are provided opportunities to work on in-depth research problems sponsored by federal and state funding agencies, industries, and private foundations. Specifically, this program prepares students to pursue careers in academia, bio-industries, and clinical settings.

Departmental Research Focus Areas include:

- Biofuels and bio-products
- Environmental and bio-sensors
- Biomechanics and biomaterials
- Cellular and tissue engineering
- Plasma medicine
- Drug delivery platforms
- Biomedical imaging, instrumentation, and artificial intelligence

## ADMISSIONS REQUIREMENTS

The Ph.D. graduate program in the Department of Bioengineering is open to all qualified individuals with a Bachelor of Science (B.S.) or Master of Science (M.S.) in Engineering. Students with a B.S., B.A., or M.S./M.A. degree in a related field are also eligible provided they meet the minimum prerequisite coursework requirement of: two (2) years of calculus through differential equations; and one (1) year of engineering physics.

To be competitive for admission, all applicants should have a grade point average of at least 3.0/4.0 for all previous undergraduate work and 3.3/4.0 for all previous graduate work. In some cases, additional prerequisite courses related to the program of study may be required (see Provisional Admission). Course credits for meeting undergraduate prerequisites are not applied toward the graduate degree.

The GRE exam is required of all students, and international students are expected to complete the TOEFL exam. The minimum scores for the GRE are set by the Department of Bioengineering; the minimum scores for the TOEFL exam are set by the College of Graduate Studies. The minimum scores considered are:

- GRE - 300 combined for the verbal and quantitative sections
- TOEFL - 550 (PBT); 213 (CBT); 80 (IBT)

## ADMISSION TO CANDIDACY

To be admitted to doctoral candidacy, all doctoral students must meet the following requirements:

- Pass the bioengineering qualifying examination.
- Select a faculty adviser and dissertation committee.

- Pass the bioengineering dissertation research proposal examination.
- Earn at least a 3.0/4.0 GPA for all graduate level course work.

## PROGRAM REQUIREMENTS

The doctor of philosophy degree in engineering requires a minimum of 90 semester hours of approved graduate course work beyond the B.S. degree or 60 semester hours beyond the M.S. degree. For students directly admitted into the Ph.D. program with a B.S. degree, the M.S. course work and the Ph.D. course work requirements must be satisfied. All course work must be approved by the student's advisor. Each student must meet the following minimum general course work requirements beyond the M.S. degree requirements:

- Register and attend the weekly bioengineering department seminar. Registration and attendance are mandatory every semester.
- Complete BIOE 6100 if not previously taken.
- Complete 9-12 hours of elective course work as approved by the adviser to support the research area.
- Complete MIME 8100 to satisfy the mathematics requirement.
- Complete at least 45 semester hours of dissertation research.

In addition to course work requirements, continuation within the Ph.D. program requires that the student pass two major examinations:

1. the qualifying exam and
2. defense of the dissertation research proposal.

Completion of the Ph.D. degree requires the writing and defense of the dissertation, and presentation and publication of the research findings.

## Qualifying Exam

For students accepted into the Ph.D. program, the Ph.D. Qualifying Exam will occur after the completion of the required first year coursework comprising the core courses in physiology, mathematics and the bioengineering core courses (see MS course requirements). The students rotate through 3 different examination topics which are mediated by 2-3 faculty members. Each testing topic lasts no more than 25 minutes; each student is asked questions of increasing difficulty until the perimeter of the student's knowledge is determined. All students are tested on the common areas of mathematics and physiology. Each student selects the third test segment from the three broad specialization areas of biomechanics, bioprocessing/molecular & cellular biology, and bioelectrical systems.

Following the finalization of the examination outcomes, the Graduate Program Director will immediately notify the students tested in writing of the testing outcome. If retesting is required, the student is also informed of the date of testing and the topic(s) to be retested. Students who do not receive an outright pass on the first examination have one opportunity to retest with a passing score or are dismissed from the program.