BIOLOGICAL ENGINEERING - DOCTOR OF PHILOSOPHY (PHD)

The Department of Chemical and Biological Engineering (ChBE) offers an innovative graduate program that emphasizes the doctoral degree. ChBE's outstanding national and international students take advantage of the high level of faculty-student collaboration and benefit from access to interdisciplinary research centers.

This degree seeks to leverage the measurement, theory and manipulation of biomolecules and biological systems for addressing the next challenges in our world. Recent advancements in imaging, data processing and synthesis have enabled access to biological information previously limited to the imagination. Thus, modern biology serves as the foundation of this program for the development of new models, processes and technologies to advance human needs.

Students who enroll in this program will learn how biological components interact on many size scales, how to understand the interplay of different interactions and networks and how to form concrete models from complex data. Key discoveries are applied to the creation of complex synthetic architectures for mimicking cell-tissue interactions, programming metabolic and synthetic pathways to drive cell-mediated chemical production of fuels and chemicals and developing smart, shape-shifting materials.

For additional information, visit the department's Biological Engineering (https://www.colorado.edu/chbe/graduate-program/biological-engineering-phd-program/) and Prospective Graduate Students (https://www.colorado.edu/chbe/graduate-program/prospective-graduate-students/) webpage.

Requirements

Course Requirements

The student must work out an informal degree plan early in the PhD program with the aid of a research committee. This degree plan must include a total of at least 30 semester hours of 5000-level or above courses and at least 30 semester hours of Doctor Thesis credits. Biological Engineering PhD students are required to complete two core courses: CHEN 5150 Biomolecular Kinetics, Transport, and Thermodynamics and CHEN 5160 Systems Analysis of Cells and Tissues.

Students are expected to complete with distinction all work in the formal courses that apply toward the degree, and achieve an overall grade-point average of 3.00 or better. A course grade below B- will not be counted toward the minimum requirements for the PhD degree, but it will be considered in the overall grade-point average.

Preliminary Examination

A preliminary examination is required of all PhD candidates. This examination consists of an oral and written component to be completed in the third semester. In addition, all students entering the program without a degree closely related to chemical engineering must either take the FE exam or have completed four chemical engineering core undergraduate courses with a grade of B or better (Fluids/Heat, Mass Transfer, Thermodynamics, Kinetics, or the equivalent courses). The graduate director or department chair will make assessments as to whether a degree is closely related to the chemical engineering degree.

Comprehensive Examination

Students must complete and pass an oral examination before the student's doctoral committee of five or more graduate faculty members chosen by the student and approved by the department and the Graduate School. This is followed by a group question-and-answer period with all committee members. The oral examination before the committee is based primarily on a written report the student provides to committee members two weeks in advance.

PhD Dissertation

Students must write a dissertation based on original research conducted under the supervision of a graduate faculty member. The dissertation must fulfill all Graduate School requirements. After the dissertation is completed, an oral final examination on the dissertation and related topics is conducted by the student's doctoral committee.

Time Limit

All degree requirements must be completed within six years of the date of commencing coursework.

Learning Outcomes

By the completion of the program, students will be able to: