

CHEMICAL 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 three interdisciplinary research centers. Department faculty and students have won numerous awards both nationally and internationally.

General research areas within ChBE include: biomaterials, biopharmaceutical engineering, catalysis, surface science and reaction engineering, complex fluids and microfluidic devices, computational science, energy and environmental applications, membranes and separations, metabolic engineering and directed evolution, nanostructured films and devices, polymer chemistry and engineering, and tissue engineering.

ChBE is one of the top research departments in the nation and maintains sophisticated facilities to support research endeavors. Although research in the department spans many diverse fields, there is a particular emphasis on research in biological engineering, functional materials and renewable energy.

For more information, visit the department's Prospective Graduate Student (<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 course credit hours of 5000-level or above courses and at least 30 semester hours of Doctor Thesis credits.

Students are required to complete three core courses:

- CHEN 5370 Intermediate Chemical Engineering Thermodynamics
- CHEN 5390 Chemical Reactor Engineering
- CHEN 5210 Transport Phenomena

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: