

# Ph.D. in Chemical Engineering

Ph.D. students earn at least 60 post-baccalaureate credits, including at least 18 credits of dissertation work. In progressing toward this degree, the student must pass the following examinations:

1. A written departmental Graduate Study Qualifying Examination administered to all Ph.D. students within the first two semesters of their matriculation to the program.
2. A comprehensive examination to be taken within two years of the qualifying examination and after completing two-thirds of their total coursework.
3. A final oral examination and defense of a dissertation based on the student's research.

To satisfy the requirements for the Ph.D. in Chemical Engineering, the student will take a minimum of 60 credits beyond the bachelor's degree.

For students entering with a Masters degree, up to 24 graded credits may be applied. Course requirements below.

EGEN 505	Advanced Engineering Analysis	3
EGEN 506	Numerical Sol to Engr Problems	3
ECHM 503	Thermodynamics	3
ECHM 533	Transport Phenomena	3
ECHM 510	Reaction Engineering/Modeling	3
ENGR 610	Rsch & Mthds in Engineering	3
ENGR 694	Seminar	1-2
Dissertation		18-25
Other Graded Courses		15-23

**Qualifying Examination:** The qualifier will be a written examination on undergraduate Chemical Engineering including: mass and energy balances, thermodynamics, separations (mass transfer), heat (energy) transfer, fluids, transport phenomena and chemical reaction engineering. The exam will be 1 hour per topic area question in an open book, open notes format and students will choose 4 subjects which they will solve the problems for, from the 7 problems provided. Each question will be graded by the Faculty member that submitted the question. Students will not be given the test back in order to protect the questions from dissemination. The results will be analyzed by a Committee composed of all Faculty and a grade of Pass (P), Fail (F) or Remediate (R) given each candidate. In cases where remediation in certain topic areas is required, the Ph.D. adviser will develop a problem solving based plan with the PhD candidate to prepare for a retest on the identified topic areas. The retest must occur prior to the next fall semester and will be overseen by the PhD. adviser. The qualifying exam must be completed within two semesters of matriculation into the Ph.D. program. Failure to take the exam in that time period may result in suspension of Ph.D. candidate status, including stipend. The exam will be administered on the second Tuesday in February of the Spring semester to all students required to take the exam in a year.

**Comprehensive Examination:** The proposal will be in the NSF format, in compliance with the current year's grant proposal guidelines (gpg) at [www.nsf.gov](http://www.nsf.gov) (<http://www.nsf.gov/>). A written exam on graduate level thermodynamics, transport phenomena, mathematical methods, and kinetics and reactor engineering will be required of graduate students who have a GPA in graduate coursework of less than 3.5. A public oral seminar of 40 minutes plus 10 minutes of public questions, on the research to date and proposed research to complete the Ph.D., will be given by the Ph.D.

candidate. This will be followed by a closed-session oral examination of 45-90 minutes by the student's Ph.D. committee.