We offer both masters and doctoral degrees in chemical engineering. Research can be in a variety of areas, including advanced energy systems, biochemical and biomedical engineering, catalysis, process optimization, nanotechnology, novel separation methods, polymers, reaction kinetics, surface science, thermodynamics, and thin films.

Any student with an undergraduate degree in chemical engineering or its equivalent from an accredited school and a grade point average (GPA) of at least 3.0 (on a 4.0 scale) during the last 60 hours of undergraduate course work may be admitted as a student in full standing.

**MASTER OF SCIENCE**

The Master of Science degree program can be readily completed in two years. A thesis is required.

Course work requirements for the M.S. degree in Chemical Engineering are:

- **3** Required Graduate-level Chemical Engineering Courses: Thermodynamics, Transport, and Kinetics 9 hours
- **2** Graduate-level Chemical Engineering Electives 6 hours
- **2** Graduate-level Science, Math, or Engineering Electives 6 hours
- **Seminar in Chemical Engineering Research (1 hour/semester)** 3-4 hours
- **Masters Thesis Course Hours** 6 hours

**TOTAL** 30-31 HOURS

A special curriculum for students with undergraduate degrees in a field such as chemistry, physics, or mechanical engineering is available.

**DOCTOR OF PHILOSOPHY**

Nine hours of course work beyond the Master of Science are required for the Ph.D. degree in chemical engineering to make a total of 90 post-baccalaureate hours. Research credit hours make up the balance of the 90 hours. The additional course work hours will be selected from advanced math, science, and engineering courses in consultation with the student's research supervisor. It is possible for a good student with a M.S. degree to complete the requirements for the Ph.D. in a period of four years.

A student working towards a Ph.D. degree must pass a qualifying exam and a general exam before being admitted as a candidate for this degree. The qualifying exam consists of written exams in 1) thermodynamics, 2) transport phenomena, and 3) kinetics and reaction engineering. The general examination involves writing a paper on the student's research project. The general examination also includes an oral presentation on the written report.

The following is a list of courses in Chemical Engineering and related disciplines (on back) that are available for graduate credit.

**CHEMICAL ENGINEERING (CH E)**
- CH E G3123 Momentum, Heat and Mass Transfer II
- CH E G3333 Separation Processes
- CH E G3432 Unit Operations Laboratory
- CH E G3473 Chemical Engineering Thermodynamics
- CH E G4153 Process Dynamics and Control
- CH E G4253 Chemical Engineering Design I
- CH E G4262 Chemical Engineering Design Laboratory
- CH E G4273 Advanced Process Design
- CH E G4473 Kinetics
- CH E G5163 Catalysis
- CH E G5183 Graduate Transport Phenomena
- CH E G5193 Characterization of Solid Surfaces
- CH E G5203 Bioengineering Principles
- CH E G5243 Biochemical Engineering
- CH E G5273 Biomedical Engineering
- CH E G5293 Transport in Biological Systems

**CHEMICAL ENGINEERING (CH E)**
- CH E G5373 Tissue Engineering
- CH E G5443 Complex Fluids Rheology Laboratory
- CH E G5453 Polymer Science
- CH E G5463 Polymer Processing
- CH E G5480 Seminar in Selected Topics in Chemical Engineering
- CH E G5523 Advanced Mathematical Methods in Science and Engineering
- CH E G5643 Natural Gas Utilization
- CH E G5673 Colloid and Surface Science
- CH E G5843 Advanced Chemical Engineering Thermodynamics
- CH E G5871 Seminar in Chemical Engineering Research
- CH E G6483 Seminar on Selected Topics in Engineering Sciences
- CH E G6613 Modern Thermodynamics Seminar
- CH E G6623 Seminar in Theoretical and Applied Kinetics
## RELATED COURSES AVAILABLE FOR GRADUATE CREDIT

### AEROSPACE AND MECHANICAL ENGINEERING (AME)
- **AME G5213** Biomechanics I
- **AME G5223** Biomechanics II
- **AME G5233** Biomaterials
- **AME G5253** Implantable Devises
- **AME G5333** Thermodynamics and Combustion
- **AME G5413** Processes in Fluid Mechanics
- **AME G5553** Mechanical Behavior of Materials
- **AME G5710** Topics in Solid Mechanics
- **AME G5720** Topics in Fluid Mechanics
- **AME G5803** Principles of Heat Transfer
- **AME G5973** Computational Heat and Fluid Flow

### CHEMISTRY AND BIOCHEMISTRY (CHEM)
- **CHEM G3653** Introduction to Biochemistry
- **CHEM G4023** Instrumental Methods of Chemical Analysis
- **CHEM G4033** Instrumental Methods of Chemical Analysis Laboratory
- **CHEM G5103** Physical and Chemical Separations
- **CHEM G5113** Equilibrium and Kinetic Methods of Analysis
- **CHEM G5123** Intermediate Physical Chemistry
- **CHEM G5233** Advanced Inorganic Chemistry -- Reactions and Mechanisms
- **CHEM G5323** Advanced Organic Chemistry
- **CHEM G5333** Advanced Inorganic Chemistry -- Bonding and Structure
- **CHEM G5433** Reaction Chemistry of the Main-Group Elements.
- **CHEM G5453** Polymer Science
- **CHEM G5673** Colloid and Surface Science
- **CHEM G5733** Principles of Biochemistry I
- **CHEM G5853** Principles of Biochemistry II
- **CHEM G6103** Electroanalytical Chemistry
- **CHEM G6453** Chemical Kinetics

### CIVIL ENGINEERING (C E)
- **C E G5114** Aquatic Chemistry
- **C E G5244** Water and Waste Treatment
- **C E G5624** Biological Waste Treatment
- **C E G5833** Ground Water Quality Protection
- **C E G5853** Groundwater and Seepage
- **C E G5923** Air Pollution Control Engineering

### ELECTRICAL ENGINEERING (E E)
- **E E G5033** Neural Networks
- **E E G5043** Fuzzy Logic
- **E E G5063** Computer Vision
- **E E G5213** Digital Signal Processing

### ENVIRONMENTAL SCIENCE (E S)
- **E S G5283** Environmental Organic Chemistry
- **E S G5324** Biological Aspects of Environmental Science
- **E S G5673** Colloid and Surface Science

### INDUSTRIAL ENGINEERING (I E)
- **I E G5323** Advanced Production Systems and Operation
- **I E G5343** Reliability in Engineering Design
- **I E G5623** Linear Programming
- **I E G5643** Engineering Optimization

### MATHEMATICS (MATH)
- **MATH G3333** Linear Algebra I
- **MATH G3343** Linear Algebra II
- **MATH G3413** Physical Mathematics I
- **MATH G3423** Physical Mathematics II
- **MATH G4163** Introduction to Partial Differential Equations
- **MATH G4413** Intermediate Ordinary Differential Equations
- **MATH G5163** Partial Differential Equations

### MICROBIOLOGY (MBIO)
- **MBIO G4833** Basic Immunology
- **MBIO G4853** Physiology of Microorganisms
- **MBIO G5843** Introduction to Molecular Biology
- **MBIO G5893** Genetics and Plasmids and Bacterial Viruses
- **MBIO G6873** Microbial Ecology

### PETROLEUM ENGINEERING (P E)
- **P E G4033** Oil, Gas and Environmental Law
- **P E G4453** Oil Reservoir Engineering
- **P E G4462** Reservoir Mechanics Laboratory
- **P E G4602** Natural Gas Engineering Laboratory
- **P E G5143** Fluid Flow in Porous Media
- **P E G5243** Introduction to Rock Mechanics
- **P E G5423** Advanced Stimulation
- **P E G5533** Petroleum Reservoir Development
- **P E G5613** Natural Gas Engineering and Management
- **P E G5623** Natural Gas Processing
- **P E G6153** Transport Phenomena in Porous Media

### PHYSICS (PHYS)
- **PHYS G3223** Modern Physics for Engineers
- **PHYS G3803** Introduction to Quantum Mechanics I
- **PHYS G5013** Mathematical Methods in Physics
- **PHYS G5163** Statistical Mechanics
- **PHYS G5243** Solid State Physics
- **PHYS G5393** Quantum Mechanics I
- **PHYS G5403** Quantum Mechanics II
- **PHYS G5573** Electrodynamics I
- **PHYS G5583** Electrodynamics II

### ZOOLOGY
- **ZOO G3103** Principles of Physiology
- **ZOO G4123** Vertebrate Physiology
- **ZOO G5153** Endocrine Physiology
- **ZOO G5364** Transmission Electron Microscopy
- **ZOO G5374** Scanning Electron Microscopy
- **ZOO G5843** Introduction to Molecular Biology