Chemical Engineering

Master of Science in Engineering
Doctor of Philosophy

For More Information

Campus address: Chemical and Petroleum Engineering Building (CPE) 2.802, phone (512) 471-6991, fax (512) 475-7824; campus mail code: C0400

Mailing address: The University of Texas at Austin, Graduate Program, McKetta Department of Chemical Engineering, Stop C0400, Austin TX 78712

E-mail: chemegrad@utexas.edu (chemegrad@che.utexas.edu)

URL: https://che.utexas.edu/academics/graduate-program

Objectives

The graduate program in chemical engineering is designed to provide students with the opportunity to develop advanced competence in transport phenomena, thermodynamics, and reaction engineering for the application of chemistry to the advancement of society. Through formal coursework and mentoring, each student is expected to acquire the tools to develop and transmit new knowledge and processes in a focused area of chemical engineering. The focused research areas include advanced materials, polymers and nanotechnology, biotechnology, energy, environmental engineering and sustainability, modeling and simulation, and process engineering.

Program Educational Objectives

Upon graduation, those who earn advanced chemical engineering degrees are expected to

a. Become leading professionals who advance chemical engineering practice and knowledge in multiple fields, such as energy, materials, environmental and systems engineering, electronics, biotechnology, human health, and education;
b. Continue to educate themselves as their needs, interests, and circumstances dictate;
c. Become ethical and productive engineers, who recognize and acknowledge the local and global impacts of engineering technology on humans and the environment.

Facilities for Graduate Work

The McKetta Department of Chemical Engineering contains laboratories, offices, and all facilities necessary for research and instruction. Research is conducted in the Chemical and Petroleum Engineering Building and across Main Campus, and also at the J. J. Pickle Research Campus. Excellent library facilities include the Mallet Chemistry Library, the McKinney Engineering Library, and the Kuehne Physics Mathematics Astronomy Library.

The extensive computer facilities available for graduate student research include more than one hundred microcomputers and workstations in the Chemical and Petroleum Engineering Building as well as super computing facilities in the Texas Advanced Computing Center. Computer graphics capabilities are available. State-of-the-art analytical instrumentation, located within the department and in other departments, is available for use by chemical engineering graduate students.

The department enjoys close relations with the chemical, petroleum, and materials processing industries. A number of cooperative research projects are carried out with the support of private companies. A substantial portion of the graduate student research is supported through federal grants and contracts.

Areas of Study

Biochemical and biomedical engineering. Protein and nucleic acid engineering, metabolic engineering, synthetic biology, systems biology, bioinformatics, fermentations, genetic engineering technology, mammalian tissue culture, biomaterials, biosensors, biomolecular interactions, cell and tissue engineering, virus removal from blood, hemodialysis.

Chemical engineering fundamentals. Kinetics and catalysts, thermodynamics, transport phenomena.

Energy resources. Secondary and tertiary oil recovery, flow processes in porous media, acid gas treating, energy control and efficiency, photovoltaics, battery technology.

Environmental engineering and sustainability. Air pollution measurements, modeling and control, air pollutant and chemical exposures, atmospheric chemistry.

Materials and processes for microelectronics. Plasma processing, etching, chemical vapor deposition, selective laser sintering, supermolecular self-assembly and organization, colloidal systems, mesoscopic materials.

Meso- and molecular-scale modeling and simulation. Statistical and micromechanical modeling and Monte Carlo, Brownian, and molecular dynamics simulations of reactions, complex fluids, polymers, and biological molecules.

Polymer engineering. Synthesis; processing; reaction injection molding; properties, with specific emphasis on blends, transport, and thermodynamic behavior; membranes; microelectronics; thin film; composition.

Process engineering. Chemical reaction engineering and catalyst development; optimization; process simulation, dynamics, and control; fault detection, rheology and simulation of suspensions.

Separations. Membrane separations, distillation, absorption, supercritical extraction.

Other areas. Aerosol science, surface phenomena, crystal chemistry and physical properties, electrochemistry, electronic and optical materials, electrical impedance tomography.

Graduate Studies Committee

The following faculty members served on the Graduate Studies Committee (GSC) in the spring 2023 semester.

David T Allen
Hal S Alper
Michael Baldea
Brian Belardi
Roger T Bonnecaze
Joan F Brennecke
James R Chelikowsky
Lydia Maria Contreras
Thomas F Edgar
John G Ekerdt
Robert B Eldridge
Benny D Freeman
Venkat Ganesan
George Georgiou
Lea Hildebrandt Ruiz
Gyeong S Hwang
Keith P Johnston
Benjamin Keith Keitz
Brian A Korgel
Manish Kumar
Yi Lu
Nathaniel Lynd
Arumugam Manthiram
Jennifer A Maynard
Delia Milliron
Charles B Mullins
Zachariah Allen Page
Nicholas A Peppas
Joaquin Resasco
Gary T Rochelle
Adrianne M Rosales
Gabriel Sanoja
Mukul M Sharma
Mark A Stadtherr
Thomas M Truskett
Wennie Wang

Admission Requirements

Students with a Bachelor of Science degree in chemical engineering usually fulfill requirements for consideration for admission.

Students with a bachelor's degree in another discipline, such as chemistry, physics, other engineering sciences, and natural sciences, must have a background the department considers satisfactory for the study of advanced chemical engineering. A strong background will have included courses in math (including calculus and differential equations), vector physics, and ideally some courses that cover the topics of thermodynamics, heat and mass transfer, and chemical kinetics.

Apart from the requirements of the Graduate School, the department has no set criteria for admission. Applications are viewed holistically based GPA, research experience, letters of recommendation, and personal statements. We view each of these categories as important and the admission committee ranks applications according to these metrics.