Graduate Study in Chemical and Petroleum Engineering

The KU Department of Chemical and Petroleum Engineering is currently at an exciting time in its history. New faculty members have bolstered traditional research strengths in catalysis, green engineering, and enhanced oil recovery processes and greatly added to research capabilities in bioengineering. New research space and renovated laboratories have created state-of-the-art work spaces for graduate students to perform cutting-edge research projects. The Center for Environmentally Beneficial Catalysis (CEBC), a new $17.1-million multidisciplinary Engineering Research Center funded by the National Science Foundation, is developing novel green technologies in partnership with some of the world's leading chemical companies. We encourage you to consider graduate study in our department and recommend a visit to our Web site, www.cpe.engr.ku.edu, for details on research areas, faculty members, or degree requirements. Information about our online application process can be accessed through KU's main Web site, www.ku.edu.

Graduate Degrees

Undergraduate programs in chemical and petroleum engineering enable a graduate to pursue a professional engineering career. For those who want deeper academic understanding of these areas of engineering or who wish to work in research and development or pursue an academic career, graduate programs at the master's and doctoral levels are available. The department offers the M.S. degree in the fields of chemical engineering and petroleum engineering. In addition, the Ph.D. degree in chemical and petroleum engineering is available.

Research Areas

Nearly all graduate students in the department are funded through fellowships and research or teaching assistantships. The minimum stipend is $19,000 per year, plus tuition and fees. Highly qualified students often receive scholarships that can increase this stipend. Students who successfully progress through the Ph.D. program also receive increased stipends. U.S. applicants may be nominated for the prestigious Self Fellowship, a highly competitive program that combines Ph.D. study with leadership development. Self Fellows earn a stipend of $23,000, plus tuition and fees. For more information, please visit www.ku.edu/~selffph.

Funding Opportunities

The department currently has a number of major research thrust areas, which include the following:

- Boiling & Drug Delivery Systems
- Catalysis & Green Engineering
- Enhanced Oil Recovery Processes
- Electrochemical Systems (Fuel Cells)
- High-Field NMR Spectroscopy
- Inorganic Crystallography
- Process Systems Engineering
- Polymer Materials

For more information, please visit www.ku.edu/~cebc.

Research Facilities

Excellent facilities are available for research and instruction. Extensive equipment and shop facilities are available for research in such areas as tissue engineering, nanoparticle formulation, controlled drug release, semiconductor processing, electrochemical research, enhanced oil recovery processes, and fluid phase equilibria. New equipment and laboratory space for catalysis and green engineering studies have been acquired as part of the CEBC. Also, excellent facilities for bioengineering projects are available through the Structural Biology Center, including new state-of-the-art high-field NMR spectroscopy, mass spectrometry, and X-ray diffraction equipment. Advanced architecture computing systems are available through KU’s Computer Center. The latest software for molecular modeling and visualization is used for computational research at the Molecular Graphics Laboratory.

The University

The University of Kansas is a major educational and research institution with 29,000 students and 2,200 faculty members. KU includes the main campus in Lawrence; the Medical Center in Kansas City, Kansas; the KU Edwards Campus in Overland Park; a clinical campus of the School of Medicine in Wichita; and educational and research facilities throughout the state. Visit KU's Web site, www.ku.edu. KU has more than 40 special research facilities, in addition to those in individual departments and schools. KU set a record of $281 million for total research expenditures in 2005. The National Science Foundation classifies KU as a major university receiving substantial research support. The Carnegie Foundation classifies KU as a research-extensive doctoral institution, a classification given to the top research universities.

KU's main campus occupies 1,000 acres on and around Mount Oread in Lawrence, a community of more than 88,500 among the forested hills of eastern Kansas. Lawrence offers shopping areas, malls, restaurants, entertainment, and recreational facilities near campus or on bus routes. Metropolitan Kansas City, with its international airport, professional sports, ballet, opera, concerts, night spots, galleries, museums, and festivals is about 45 minutes away by interstate highway.

The University of Kansas prohibits discrimination on the basis of race, color, religion, sex, national origin, age, ancestry, disability, veteran status, sexual orientation, marital status, and parental status.

Additional Information

Please direct all inquiries to:

The University of Kansas
Graduate Recruiting Coordinator
Department of Chemical and Petroleum Engineering

Learned Hall
1530 W. 15th St., Room 4132
Lawrence, KS 66045-7609

Telephone: (785) 864-2900
E-mail: gradrec@ku.edu
Web site: www.cpe.engr.ku.edu

Online Graduate School application: www.grad.ku.edu
Course Listing

These courses are part of the core curricula. Remedial courses based on deficiencies in the area of mathematics, science, and language skills are available. Course work in mathematics and science are chosen from this list.

C&PE 511: Momentum Transfer (3)  
C&PE 512: Process Engineering Thermodynamics (3-4)  
C&PE 521: Mass Transfer (4)  
C&PE 522: Economic Appraisal of Chemical and Petroleum Projects (2)  
C&PE 523: Mass Balance Analysis (4)  
C&PE 524: Chemical Engineering Kinetics and Reactor Design (3)  
C&PE 527: Reservoir Engineering 8 (4)  
GEOL 535: Petroleum Subsurface Geology (4)  
C&PE 619: Waterflooding (3)  
The following is a selection of advanced-standing and graduate courses offered in the department.

C&PE 655: Introduction to Rheology (3)  
C&PE 664: Introduction to Biomaterials (3)  
C&PE 701: Methods of Chemical and Petroleum Calculations (3)  
C&PE 715: Thermal and Fluid Systems Engineering (1-4):  
Fuel Cells  
Optimization of Chemical and Petroleum Engineering Systems  
Process Structure and Function  
Tissue Engineering  
C&PE 721: Chemical Engineering Thermodynamics  
C&PE 722: Kinetics and Catalysis (3)  
C&PE 731: Convective Heat and Mass Transfer (3)  
C&PE 732: Advanced Transport Phenomena II (3)  
C&PE 765: Corrosion Engineering (3)  
C&PE 771: Advanced Reservoir Engineering (3)  
C&PE 795: Enhanced Petroleum Recovery (3)  
C&PE 802: Advanced Topics in Chemical and Petroleum Engineering (4)  
C&PE 940: Data Analysis in Engineering and Natural Sciences (3)  

Faculty

cory J. berkland, assistant professor (jointly appointed in pharmaceutical chemistry, Ph.D., university of illinois, 2003)  
Research interests: Novel techniques to fabricate precisely structured biomedical or drug delivery devices; tracking of dynamic molecular partitioning and interfacial phenomena. Molecular engineering of polymers.


don W. green, dean E. ackers, director of tertiary oil recovery project, Ph.D., university of oklahoma, 1963. Research interests: Enhanced oil recovery methods of increasing recovery from petroleum reservoirs. Techniques include polymer flooding, application of gelled polycrylamide polymers for flow control, and carbon dioxide miscible flooding.

colin S. howat, associate professor and john E. and winifred E. sharp professors, director of kurusa thermodynamics laboratory, Ph.D., university of kansas, 1983. Research interests: Plant performance analysis, process design reliability, and phase equilibria thermodynamics. Recent emphasis has been interpreting formally plant performance data; developing the relationship between design process reliability and database/operation uncertainties. Another focus is experimental phase equilibria of mixtures of dis-similar molecules at infinite dilution.


trung V. Nguyen, professor and graduate adviser, Ph.D., texas A&M, 1988. Research interests: Fuel cells and batteries and mathematical modeling of electrochemical systems. Current focus is on interfacial phenomena at the electrode/membrane/membrane interface. Techniques include experimental studies of two-phase transport and spatiotemporal behavior in porous electrodes, fuel, gas, and water management in PEM fuel cells; and electrode and membrane fabrication processes.

Karen J. norheden, associate professor, Ph.D., university of illinois, 1988. Research interests: Developing and implementing new plasma etch processes for semiconductor device improvement. Current projects include the development of processes for the fabrication of optoelectronic devices based on ZnO, GaN, and InGaN.


Bala Subramaniam, dan E. servy distinguished professor and director, Center for environmentally friendly catalysis, Ph.D., university of notre dame, 1984. Research interests: Green catalysis and engineering. Current projects include exploiting green details such as carbon dioxide and water in catalytic oxidations, hydroformulations, and alkylations, and pharmaceutical processing with near-critical carbon dioxide.


g. Paul willibotz, h. H. Horner distinguished professor, Ph.D., university of tropical oil recovery project Co-Director of Energy research center, Ph.D., University of kansas, 1962. Research interests: Enhanced oil recovery processes involving the study of processes that has included, but is not limited to the displacement of oil from petroleum reservoirs. Research projects range from fundamental studies of displacement mechanisms to numerical simulation of process performance. Transport processes in porous media. susan M. Stagg-Williams, assistant professor, Ph.D., University of kansas, 1999. Research interests: Production of syntheses catalysts and solid acids alternatives as alternatives for fine chemical production.

professors emeriti


Carol J. Ewing, professor emeritus, Ph.D., university of texas (austin), 1972.

James O. Maloney, professor emeritus, Ph.D., pennsylvania state university, 1941.


Floyd W. Preston, professor emeritus, Ph.D., university of texas (austin), 1972.

George W. Swift, professor emeritus, Ph.D., university of kansas, 1941.

Stanton M. Walas, professor emeritus, Ph.D., university of michigan, 1941.