Wayne H. King Department of Chemical Engineering and Natural Gas Engineering

Contact Information

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The objectives of the graduate studies in the Chemical and Natural Gas Engineering programs are as follows.

a. To prepare students for successful careers and major contributions to the petroleum and chemical process industries by instilling in them fundamental concepts as well as practical knowledge of modern engineering to overcome current as well as future challenges of the industries.
b. To prepare students for doctoral study in petroleum/chemical or related disciplines.
c. To instill in students a sense of responsibility to their profession and to society in general.

The Wayne H. King Department of Chemical Engineering and Natural Gas Engineering offers programs in developing interdisciplinary specialties, as well as in the more traditional areas of Chemical and Natural Gas Engineering.

Several modern engineering buildings contain laboratories, including unit operations, process control, gas measurement and drilling facilities. Excellent computer facilities also are available.

Degrees Offered

- The Ph.D. degree is available in Sustainable Energy Systems Engineering.
- The Master of Science degree is available in Chemical and Natural Gas Engineering

Chemical Engineering (CHEN)

CHEN 5303 Adv Topics in Chemical Engng **1-3 SCH (1-3)**
One or more advanced topics. May be repeated for a maximum of six SCH when topic changes.

CHEN 5305 Graduate Research Project **3 SCH (3)**
Designed for project option students. Requires successful completion of an assigned research project topic. May be repeated for a maximum of six SCH. Project advisor approval and enrollment in final 3 SCH of required course work, or completion of all required course work. Minimum GPA of 3.0.

CHEN 5306 Graduate Thesis Research **3 SCH (3)**
Designed for thesis option students. Requires successful completion of a thesis research proposal and final thesis. May be repeated for maximum of 6 semester hours. Thesis advisor approval and completion of 24 SCH of course work with a minimum GPA of 3.5.

CHEN 5308 Transport Phenomena **3 SCH (3-0)**
An advanced and unified treatment of fluid mechanics, heat transfer, and mass transfer based upon the fundamental equations of mass, momentum, energy and species transport with applications in chemical engineering and related fields.

CHEN 5309 Separation Process **3 SCH (3-0)**
Advanced treatment of the theory and methods associated with the solution, behavior and computation of both staged and continuous separation processes. Prerequisite: CHEN 4389 or equivalent. (Credit may not be obtained in both CHEN 5309 and NGEN 5309.)

CHEN 5331 Simulation & Analy of Chem Eng **3 SCH (3-0)**
Analytical and numerical techniques for the simulation and analysis of processes and equipment employed in the chemical, biochemical, environmental and petroleum refining industries. Prerequisite: CHEN 4317 or equivalent.

CHEN 5333 Chem & Catalytic Reaction Eng **3 SCH (3-0)**
Analysis of various interactions between reaction kinetics and transport effects in chemical reactors and their influences on design, scale-up and analysis of performance. Prerequisite: CHEN 4373 or equivalent and CHEN 5308.

CHEN 5334 Biochemical Reaction Engng **3 SCH (3-0)**
Kinetics of microbial growth and enzyme-catalyzed reactions and the analysis of kinetic-transport interactions in biochemical reactors, including their influence on the design, scale-up and performance of biochemical reactor systems.

CHEN 5336 Polymer Rheology **3 SCH (3-0)**
The study of non-Newtonian fluid flow behavior, including both theoretical and practical aspects of non-Newtonian fluid flows and their applications. Prerequisite: CHEN 5308. (Credit may not be obtained in both CHEN 5336 and NGEN 5336.)

CHEN 5360 Adv Chem & Natural Gas Proc **3 SCH (3-0)**
Study of key processes that are utilized in the chemical & natural gas industry, including analysis, design methods and optimization with a consideration of process economics, environmental and safety aspects. (Credit may not be obtained in both CHEN 5360 and NGEN 5360.)

CHEN 5361 Adv Proc Dynamics & Control **3 SCH (3-0)**
Fundamentals of modern process control theory with applications in the chemical, biochemical and petroleum refining industries. Prerequisite: CHEN 4392 or equivalent.

CHEN 5371 Adv Chem Eng Thermodynamics **3 SCH (3-0)**
Advanced treatment of the thermodynamics of multicomponent and multiphase fluid systems, with application to phase equilibria and chemical reaction equilibria. Prerequisite: CHEN 3371 or equivalent.

CHEN 5401 Advance Probs in Chem Eng **1-4 SCH (1-4)**
Individual or group research on advanced problems in chemical engineering conducted under the supervision of a faculty member. Maximum of 8 SCH allowed. Completion of 15 SCH of the required core courses and 6 SCH of electives with a minimum GPA of 3.25.

Natural Gas Engineering (NGEN)

NGEN 5303 Advncd Topics in Nat Gas Engin **1-3 SCH (1-3-0)**
One or more advanced topics. May be repeated for a maximum of 6 semester hours when topic changes.

NGEN 5305 Graduate Research Project **3 SCH (3)**
Designed for project option students and requires completion of research project. Prerequisite: departmental approval. May be repeated for a maximum of 6 semester hours.

NGEN 5306 Thesis **3 SCH (3)**
Designed for thesis option students. The course requires completion of thesis research. Prerequisite: departmental approval. May be repeated for maximum of 6 semester hours.

NGEN 5309 Separation Process **3 SCH (3-0)**
Advanced treatment of the theory and methods associated with the solution, behavior and computation of both staged and continuous separation processes. Prerequisite: CHEN 4389 or equivalent. (Credit may not be obtained in both CHEN 5309 and NGEN 5309.)

NGEN 5312 Pressure Transient Analysis **3 SCH (3-0)**
Methods of analysis of pressure transient data obtained from well testing for the purpose of determining in situ reservoir characteristics and conditions.

NGEN 5325 Nat Gas Prod and Distribution **3 SCH (3-0)**
Theory, design and methods of gas well testing and production. Distribution topics include pipeline and compressor design and flow measurement. Prerequisite: NGEN 4375.

NGEN 5327 Nat Gas Drilling Engineering **3 SCH (3-0)**
Drilling equipment and methods, drilling fluids, completion of wells including casing and cementing design. Prerequisite: NGEN 3393.

NGEN 5336 Polymer Rheology **3 SCH (3-0)**
The study of non-Newtonian fluid flow behavior, including both theoretical and practical aspects of non-Newtonian fluid flows and their applications. Prerequisite: CHEN 5308. (Credit may not be obtained in both CHEN 5336 and NGEN 5336.)

NGEN 5360 Adv Chem & Natural Gas Proc **3 SCH (3-0)**
Study of key processes that are utilized in the chemical & natural gas industry, including analysis, design methods and optimization with a consideration of process economics, environmental and safety aspects. (Credit may not be obtained in both CHEN 5360 and NGEN 5360.)

NGEN 5363 Advanced Reservoir Engineering **3 SCH (3-0)**
Phase relations of hydrocarbon systems, material balance methods, flow in reservoirs and displacement of gas. The application of computers to reservoir engineering.

NGEN 5387 Quantitative Well Log Analysis **3 SCH (3-0)**
Theory of special well-logging techniques and applications.

NGEN 5401 Advanced Probs in Nat Gas Engi **1-4 SCH (1-4)**
Individual or group research on advanced problems conducted under the supervision of a faculty member. Maximum credit of 8 semester hours.

Master's Programs in Chemical Engineering

Master's Program in Chemical Engineering- Thesis Option I

Code	Title	Semester Credit Hours
Core Requirements		**15**
CHEN 5303	Adv Topics in Chemical Engng	
CHEN 5308	Transport Phenomena	

CHEN 5309	Separation Process	
CHEN 5333	Chem & Catalytic Reaction Eng	
CHEN 5371	Adv Chem Eng Thermodynamics	
In addition to the above, the course below must be taken twice for a total of six (6) semester credit hours		**6**
CHEN 5306	Graduate Thesis Research	
Elective Courses		**9**
TOTAL		30 Credits

Master's Program in Chemical Engineering- Project Option II

Code	Title	Semester Credit Hours
Core Requirements		**15**
CHEN 5303	Adv Topics in Chemical Engng	
CHEN 5308	Transport Phenomena	
CHEN 5309	Separation Process	
CHEN 5333	Chem & Catalytic Reaction Eng	
CHEN 5371	Adv Chem Eng Thermodynamics	
Graduate Research Program		
CHEN 5305	Graduate Research Project	3
Elective Courses		**18**
TOTAL		**36 Credits**

Chemical Engineering Electives

Code	Title	Semester Credit Hours
CHEN 5331	Simulation & Analy of Chem Eng	3
CHEN 5334	Biochemical Reaction Engng	3
CHEN 5401	Advance Probs in Chem Eng	1-4
CHEN 5336	Polymer Rheology	3
CHEN 5360	Adv Chem & Natural Gas Proc	3
CHEN 5361	Adv Proc Dynamics & Control	3

Master's Programs in Natural Gas Engineering

Master's Program in Natural Gas Engineering - Thesis Option I

Code	Title	Semester Credit Hours
Core Requirements		**15**
NGEN 5325	Nat Gas Prod and Distribution	
NGEN 5327	Nat Gas Drilling Engineering	
NGEN 5336	Polymer Rheology	
NGEN 5360	Adv Chem & Natural Gas Proc	
NGEN 5363	Advanced Reservoir Engineering	
In addition to the above, the course below must be taken twice for a total of six (6) semester credit hours		
NGEN 5306	Thesis	
Elective Courses		**9**
TOTAL		**30 Credits**

Master's Program in Natural Gas Engineering - Project Option II

Code	Title	Semester Credit Hours
Core Requirements		**15**
NGEN 5325	Nat Gas Prod and Distribution	
NGEN 5327	Nat Gas Drilling Engineering	
NGEN 5336	Polymer Rheology	
NGEN 5360	Adv Chem & Natural Gas Proc	
NGEN 5363	Advanced Reservoir Engineering	
In addition to the above		
NGEN 5305	Graduate Research Project	3
Elective Courses		**18**
TOTAL		**36 Credits**

Natural Gas Engineering Electives

Code	Title	Semester Credit Hours
NGEN 5303	Advncd Topics in Nat Gas Engin	1-3
NGEN 5309	Separation Process	3
NGEN 5312	Pressure Transient Analysis	3
NGEN 5387	Quantitative Well Log Analysis	3
NGEN 5401	Advanced Probs in Nat Gas Engi	1-4