

Wayne H. King Division of Chemical and Environmental Engineering

Chemical Engineering Program Overview

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

- 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.
- To prepare students for doctoral study in petroleum/chemical or related disciplines.
- To instill in students a sense of responsibility to their profession and to society in general.

Environmental Engineering Program Overview

The Environmental Engineering Program is an interdisciplinary program, which prepares graduate students for professional careers in one or more of the following areas: Air Quality, Water Quality, Solid/Hazardous Waste, Ecological Engineering, Environmental and Occupational Health, Environmental Systems, Environmental Informatics, and Environmental Biotechnology. There are state-of-the-art laboratories and computer facilities available for research and teaching.

Environmental Engineering master's students are eligible to take doctoral-level environmental engineering courses as part of their degree plan, and two or more electives from the environmental engineering curricula or other disciplines with committee approval.

Entrance Requirements

Students must hold a minimum of a baccalaureate degree and an acceptable TOEFL or IELTS score (international students) and grade point average. Applications will be considered on an individual basis. Contact the M.S. Coordinator, Department of Environmental Engineering, for details.

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 5325 Math Methods in Chemical Eng **3 SCH (3-0)**

Introduction to the formulation of advanced mathematical models in terms of differential and algebraic equations and the mathematical methods needed to obtain generate analytical and/or numerical solutions. Modeling aspects will focus on the macroscopic and microscopic transport laws and conservation principles that occur in the modern practice of chemical engineering and related fields. The mathematical methods will cover those commonly used for solution of the resulting linear, non-linear differential or differential/algebraic modeling equations. The efficient utilization of modern software tools to generate analytical and numerical solutions, such as MAPLE and MATLAB, will also be taught. Prerequisites: MATH 3320.

CHEN 5331 Simulation & Anal 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 Advanced Chemical Reactor Engr **3 SCH (3-0)**

Complex chemical kinetics, transport phenomena, and mathematical modeling for design, analysis, and optimization of industrial-scale reactors. Application of advanced computational methods to complex kinetics and the advanced design of chemical reactors.

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.

CHEN 6306 Proposal/Dissertation Research 1-9 SCH (0-0-1-9)

This course is for doctoral students undertaking dissertation research to take towards fulfilling doctoral dissertation proposal and dissertation requirements.

Environmental Engineering (EVEN)

EVEN 5303 Advanced Topics in Environmental Engineering 1-3 SCH (1-3)

One or more advanced topics. May be repeated for credit when topic changes.

EVEN 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.

EVEN 5306 Thesis 3 SCH (3)

For thesis option students. The course requires 6 hours of grades, the first 3 hours consisting of completion of a thesis proposal and the last 3 hours consisting of completion of the thesis. Completion of the thesis proposal is a prerequisite for enrollment in the last 3 hours of thesis.

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.

Graduate Programs

- Chemical Engineering, M.S.
- Environmental Engineering - Environmental Sustainability and Resilience, M.S.
- Environmental Engineering, M.S.

Academic Certificates

- Applied Environmental Data Sciences, Academic Certificate

Planned Course Offerings

This section provides a comprehensive list of graduate courses offered by the Division of Chemical Engineering and Environmental Engineering, along with a two-year schedule indicating when each course is expected to be available. Please note that course offerings and scheduling are subject to change based on faculty availability and student demand. To ensure steady progress toward degree completion, students are strongly encouraged to work closely with their advisor to develop a personalized academic plan.

Chemical Engineering (CHEN)

Course	Fall 2026	Spring 2027	Fall 2027	Spring 2028
CHEN 5303	X		X	
CHEN 5305	X	X	X	X
CHEN 5306	X	X	X	X
CHEN 5308		X		X
CHEN 5309	X		X	
CHEN 5331		X		X
CHEN 5333	X		X	
CHEN 5334 ¹				
CHEN 5336	X			
CHEN 5360 ¹				
CHEN 5361 ¹				
CHEN 5371		X		X
CHEN 5401		X		X

¹ This course is available during the summer term only.

Environmental Engineering (EVEN)

Course	Fall 2026	Spring 2027	Fall 2027	Spring 2028
EVEN 5303		X		X
EVEN 5305		X		X
EVEN 5306	X	X	X	X

Natural Gas Engineering (NGEN)

Course	Fall 2026	Spring 2027	Fall 2027	Spring 2028
NGEN 5303 ¹				
NGEN 5305		X		X

NGEN 5306		X		X
NGEN 5309	X			
NGEN 5312	X			
NGEN 5325		X		X
NGEN 5327		X		X
NGEN 5336	X			
NGEN 5360	X		X	
NGEN 5363		X		X
NGEN 5387 ¹				
NGEN 5401		X		X

¹ This course is available during the summer term only.

Marketable Skills

Texas A&M University-Kingsville is dedicated to equipping graduate and doctoral students with the advanced marketable skills necessary for professional and academic excellence beyond the university setting. These skills encompass a range of high-level interpersonal, analytical, and applied competencies that are sought after in today's competitive workforce.

Our graduate programs are structured to cultivate these capabilities through rigorous academic inquiry, experiential learning, faculty-mentored research, professional internships, and opportunities for scholarly and community engagement.

Below are the marketable skills cultivated through each of the division's graduate academic programs.

Chemical Engineering, M.S.

- Effective communication
- Team player
- Computer and digital technology
- Processing and design
- Creativity and skillfulness in research

Environmental Engineering, M.S.

- Knowledge-based skills
- Problem-solving skills
- Professional skills