WAYNE H. KING DEPARTMENT OF CHEMICAL ENGINEERING AND NATURAL GAS ENGINEERING

Contact Information
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Chemical Engineering Program Educational Objectives
The Chemical Engineering Program seeks to prepare graduates who, after the first few years of their professional career, have:

1. Established themselves either as practicing chemical engineers, or by gaining additional formal education through enrollment in either an engineering or business graduate school program.
2. Adapted to ever-changing demands by updating their core knowledge and abilities through on-the-job training and continuing education courses.
3. Functioned successfully in their professional responsibilities, which include safety, health, environmental, and ethical aspects.
4. Established themselves as critical, flexible thinkers who demonstrated potential as future technology experts or technology managers in their professional and in society.

Natural Gas Engineering Program Educational Objectives
The Natural Gas Engineering Program seeks to prepare graduates who, after the first few years of their professional career, have:

1. Established themselves either as practicing natural gas engineers, or have gained additional formal education through enrollment in either an engineering or business graduate school program.
2. Adapted to ever-changing demands by updating their core knowledge and abilities through on-the-job training and continuing education courses.
3. Functioned successfully in their professional responsibilities, which include safety, health, environmental, and ethical aspects.
4. Established themselves as critical, flexible thinkers with demonstrated potential as future technology experts or technology managers in their profession and in society.

Faculty
Department Faculty
Alexander, Matthew L Associate Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., Trinity University; M.S., Georgia Institute of Technology; Ph.D., Purdue University.

Amaya, Joseph Visiting Assistant Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., Texas A&M University-Kingsville; M.S., Texas A&M University-Kingsville; Ph.D., Texas A&M University-Kingsville.

Cabezas, Jose Professor of Practice, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., Escuela Superior Politécnica del Litoral (Ecuador); M.S., Texas A&M University-Kingsville; Ph.D., Texas A&M University-Kingsville.

Duarte, Horacio Associate Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., Instituto Tecnologico Regional de Durango (Mexico); M.Eng., Instituto Tecnologico y de Estudios Superiores de Monterrey (Mexico); Ph.D., Texas A&M University.

Fan, Zhaoqi Assistant Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.Sc., China University of Petroleum (China); Ph.D., China University of Petroleum (China); Ph.D., University of Regina (Canada).

Lopez Manriquez, Alberto Associate Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., National University of Autonomos of Mexico (Mexico); M.Sc., National University of Autonomus of Mexico (Mexico); Ph.D., The University of Texas at Austin.

Mills, Sr., Patrick Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; B.S., Tri-State University; M.S., Washington University in St. Louis; D.Sc., Washington University in St. Louis.

Pilehvari, Ali Professor, Wayne H. King Department of Chemical and Natural Gas Engineering; Chair; B.S., Tehran Polytechnique (Iran); M.E., University of Tulsa; Ph.D., University of Tulsa.

Rahmani, Nazmul Lecturer I, Wayne H. King Department of Chemical and Natural Gas Engineering; B.Sc., Bangladesh University of Engineering and Technology (Bangladesh); M.Sc., University of North Dakota; Ph.D., University of Alberta (Canada).
Courses

Chemical Engineering (CHEN)

CHEN 1201 Engineering as a Career  2 SCH (1-3)
Introduction to chemical engineering and its role in society. Chemical engineering skills, tools and techniques applied to problem solving and academic and professional survival strategies. Introduction to conservation principles, transport phenomena, design and ethics. Includes a writing component as well as use of computers (spreadsheets, tables, graphing and simulations). For students planning to pursue a career in chemical engineering.
Fee: $5.00

CHEN 1301 Engineering as a Career  3 SCH (3-0)
Principles of student success in college. Chemical engineering as an academic and professional career. Conversion of problem data to a unified unit system for problem solution.

CHEN 2371 Conservation Principles I  3 SCH (3-0)
Applications of the conservation laws of mass to the solution of chemical engineering problems. Prerequisites: PHYS 2325/2125.

CHEN 2372 Conservation Principles II  3 SCH (3-0)
Applications of the conservation laws of energy to the solution of chemical engineering problems. Prerequisite: CHEN 2371.

CHEN 3310 Heat Transport Phenomena  3 SCH (3-0)
Fundamentals of energy transport and system applications involving this operation including computer applications to heat exchanger design. Prerequisites: CHEM 3323/3123.

CHEN 3315 Chemical Process Design I  3 SCH (3-0)
Basic principles and techniques of economic analysis and cost engineering with applications to problems in chemical process and equipment design. Prerequisites: CHEN 2371 and credit for or registration in CHEN 3310.

CHEN 3321 Process Simulation  3 SCH (3-0)
Basic numerical methods used in chemical process simulation. An introduction to the use of commercial process simulators, with hands-on applications. Prerequisite: MATH 3320. Corequisite: CHEN 3371.

CHEN 3347 Chem Eng Thermodynamics I  3 SCH (3-0)
Theory and applications of the first and second laws of thermodynamics to mechanical, chemical, magnetic and electrical interactions for both reversible and irreversible processes. Prerequisite: PHYS 2326/2126.

CHEN 3371 Chemical Thermodynamics II  3 SCH (3-0)
Procedures for deciding when and to what extent chemical reactions and phase changes may be expected to occur according to the basic principles of physical chemistry and the laws of thermodynamics. Application of computers to advanced thermodynamic problems. Prerequisites: CHEM 3325/3125.

CHEN 3392 Fluid Transport Phenomena  3 SCH (3-0)
Fundamentals of momentum transport, including fluid statics, flow or compressible and incompressible fluids, pumps, turbines, and compressors, with computer applications. Prerequisites: MATH 3320 and credit or registration in MEEN 2302 or MEEN 2355.

CHEN 4120 Seminar in CHEN  1 SCH (1-0)
Seminar on contemporary issues in Chemical Engineering. Prerequisite: junior standing.

CHEN 4130 Service Learning in CHEN  1 SCH (1-0)
Service learning experience in a project that engages a community agency and raises awareness of chemical engineering professional issues. Prerequisite: junior standing.

CHEN 4278 Unit Operations  2 SCH (0-6)
Selected laboratory experiments on fluid flow and heat transfer. Prerequisite: CHEN 3310.
Fee: $5.00

CHEN 4279 Unit Operations Lab  2 SCH (0-6)
Selected laboratory experiments on heat and mass transfer. Prerequisite: CHEN 4378 and CHEN 4389.
Fee: $5.00

CHEN 4311 Biochemical Engineering  3 SCH (3-0)
Principles involved in the processing of biological materials using biological agents such as cells, enzymes or antibodies. Prerequisites: CHEM 3325/3125.

CHEN 4316 Chemical Process Design II  3 SCH (3-0)
The application of chemical engineering principles to a sequence of design problems utilizing computer software, such as SIMSCI. Prerequisites: CHEN 3315, CHEN 3371 and CHEN 3310.
CHEN 4317 Chem Process Design III (Wi) 3 SCH (3-0)
The application of chemical engineering principles, including economic criteria to a comprehensive design problem. Computer software is utilized as a design aid. Prerequisites: CHEN 4316, CHEN 4373, CHEN 4389 and credit for or registration in CHEN 4392.

CHEN 4335 Special Problems 1-3 SCH (1-3)
Individual solution of selected problems in chemical engineering conducted under direct supervision of a faculty member. May be repeated for up to six hours. Prerequisite: senior standing.

CHEN 4373 Chemical Reactor Engineering 3 SCH (3-0)
Chemical reaction rates and design of chemical reactors. Applications of computers to chemical kinetics and the design of chemical reactors. Prerequisites: CHEN 3371, CHEN 3310 and CHEM 3332.

CHEN 4383 Natural Gas Process 3 SCH (3-0)
The design, operation and economics of systems for the utilization of hydrocarbon gases and liquids, the concentration of their components by absorption and fractionation procedures. Use of computer aided design and economic evaluation of facility designs. Prerequisites: CHEN 4389.

CHEN 4386 Air Pollution Control 3 SCH (3-0)
A fundamental approach to air pollution testing, control and design of control systems. Introduction to dispersion modeling via computer. Prerequisite: CHEN 3392 and senior standing.

CHEN 4389 Mass Transport Phenomena 3 SCH (3-0)
Fundamentals of mass transport, including gas absorption, extraction, membrane separation, binary and multicomponent distillation, with computer design applications. Prerequisites: CHEM 3331, CHEN 3371 and credit or registration in CHEN 3310.

CHEN 4392 Process Dynamics and Control 3 SCH (2-3)
Basic operating theory of control instruments and their application to industrial chemical process. Applications of computers to process control. Prerequisites: CHEN 4373 and CHEN 4389.
Fee: $5.00

CHEN 4399 Internship in CHEN 1-3 SCH (1-3)
Internships in industry, government, or consulting companies in career-based practical activities to broaden the skills obtained through curricular education. Prerequisite: junior standing.

Natural Gas Engineering (NGEN)

NGEN 3322 Funds of Reservoir Engg 3 SCH (2-3)
Physical properties of petroleum reservoir rocks, lithology, porosity, fluid saturations, permeability and capillary characteristics as they relate to the production of oil and gas. Properties of hydrocarbon systems. Material balance methods. Flow of fluids in porous media. Prerequisites: Credit or registration in CHEN/NGEN 3392, GEOL 1303/1103 and CHEM 3323. Corequisite: CHEM 3123.
Fee: $5.00

NGEN 3392 Fluid Transport Phenomena 3 SCH (3-0)
Fundamentals of momentum transport including fluid statics, flow of compressible and incompressible fluids, pumps, turbines, and compressors, with computer applications. Prerequisite: MATH 3320; credit or registration in MEEN 2355 or MEEN 2302. (Credit may not be obtained in both NGEN 3392 and CHEN 3392.)

NGEN 3393 Natural Gas Drilling Engg 3 SCH (2-3)
Introduction to drilling equipment and methods, drilling fluids, casing and cementing of wells. Application of computers to the drilling of wells. Contemporary methods of well completion. Prerequisites: NGEN 3322 and CHEN 3392 or NGEN 3392.

NGEN 4279 Unit Operations Laboratory 2 SCH (0-6)
Selected laboratory experiments in heat and mass transfer. Prerequisite: CHEN 4389. (Credit may not be obtained in both NGEN 4279 and CHEN 4279.) Fee: $5.00

NGEN 4335 Special Problems 1-3 SCH (1-3)
Individual solution of selected problems in natural gas engineering conducted under direct supervision of a faculty member. May be repeated for up to 6 semester hours. Prerequisite: senior standing.

NGEN 4375 Natural Gas Distribution 3 SCH (3-0)
Pipeline and compressor station design. Pipeline integrity and environmental issues associated with pipeline placement and design. Prerequisite: CHEN 3392 or NGEN 3392.

NGEN 4383 Natural Gas Processes 3 SCH (3-0)
The design, operation and economics of systems for the utilization of hydrocarbon gases and liquids, the concentration of their components by absorption and fractionation procedures. Use of computer aided design and economic evaluation of facility designs. Prerequisite: CHEN 4389. (Credit may not be obtained in both NGEN 4383 and CHEN 4383.)

NGEN 4387 Seismic Interp & Well-Logging 3 SCH (3-0)
Theory and methods of modern seismic and well log interpretation. Prerequisite: NGEN 3493 or GEOL 3431.
NGEN 4396  Natural Gas Production  3 SCH  (3-0)
Theory, design and methods of gas well testing and production forecasting. Estimating the value of gas and oil properties. Environmental issues and
professional responsibility. Prerequisites: NGEN 3322 / CHEN 3392.

NGEN 4398  Capstone Design Project (WI)  3 SCH  (2-3)
In teams, students complete significant design projects that include two or more aspects of natural gas engineering. Prerequisite: Student has 6 or
fewer credit hours of NGEN courses to complete in subsequent terms.

NGEN 4478  Hydrocarbon Measurement  4 SCH  (3-3)
Theory and practice of measurement of hydrocarbon gas and liquid properties and flow. Prerequisites: NGEN/CHEN 3392 / NGEN 4375.

Degree Requirements
Majors
- Chemical Engineering, B.S. (https://catalog.tamuk.edu/undergraduate/engineering/chemical-natural-gas/chemical-engineering-bs)