Petroleum Engineering is concerned primarily with the economic extraction of oil, gas, and other natural resources from the earth. Oil and gas is produced through the design, drilling and operation of wells and well systems, and the integrated management of the underground reservoirs in which the resources are found.

The mission of the Petroleum Engineering Department is to create, preserve, integrate, transfer and apply petroleum engineering knowledge and to enhance the human capability of its practitioners. The Petroleum Engineering Program has two educational objectives:

- graduates will have the technical depth and breadth to be successful professionals early in their careers; and
- graduates will have the broad technical knowledge and soft skills needed to rise to positions of professional leadership.

In essence, the goal of the Petroleum Engineering curriculum is to provide a modern engineering education with proper balance between fundamentals and practice, and to graduate engineers capable of being productive contributors immediately who are also prepared for life-long learning. The curriculum includes study of:

- design and analysis of well systems and procedures for drilling and completing wells;
- characterization and evaluation of subsurface geological formations and their resources;
- design and analysis of systems for producing, injecting and handling fluids;
- application of reservoir engineering principles and practices for optimizing resource development and management; and
- use of project economics and resource valuation methods for design and decision making under conditions of risk and uncertainty.

There is a heavy emphasis on mathematics, computer applications, communication skills and interdisciplinary problem solving. As a result, Aggie petroleum engineers are in high demand in the industry, and their starting salaries are consistently among the top in the University and the nation.

The department is well known for its curriculum, facilities and faculty, and its undergraduate program was recognized as one of the top petroleum engineering programs in the United States. The faculty comprises more than 41 professors and lecturers, many of them widely known and globally involved in the petroleum industry. Three (3) of the faculty are members of the prestigious National Academy of Engineering, and 18 are Distinguished Members of the Society of Petroleum Engineers. The Bachelor of Science program is accredited by the Engineering Accreditation Commission of ABET, www.abet.org.

Students must work as interns during the summer months; a minimum of six weeks of approved experience is required for graduation. The department also participates in the Cooperative Education Program.

In addition to the Bachelor of Science degree in Petroleum Engineering, the department also offers both masters and doctoral degrees, including the Master of Science and Master of Engineering, and the Doctor of Philosophy and Doctor of Engineering (see the Texas A&M University Graduate and Professional Catalog).

Before commencing course work in the major, students must be admitted to the major or have the approval of the department.

**Faculty**

Abedi Mashhadimighani, Sara, Assistant Professor
Petroleum Engineering
PHD, University of Southern California, 2012

Akkutlu, Ibrahim Y, Associate Professor
Petroleum Engineering
PhD, University of Southern California, 2002

Barrufet, Maria A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1987

Bastian, Peter A, Professor of the Practice
Petroleum Engineering
MS, Texas A&M University, 1983

Blasingame, Thomas A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1989

Dattagupta, Akhil, Distinguished Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1992

Dupriest, Fred E, Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1977

Gildin, Eduardo, Associate Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 2006

Hasan, Abu Rashid, Professor
Petroleum Engineering
PHD, University of Waterloo, Canada, 1979

Hascakir, Berna, Assistant Professor
Petroleum Engineering
PHD, Middle East Technical University, 2008

Holditch, Stephen A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1976

Jochen, John E, Senior Lecturer
Petroleum Engineering
MS, Texas A&M University, 1993

Kennedy, William D, Professor of the Practice
Petroleum Engineering
MS, The University of Texas at Dallas, 1982

Killough, John E, Professor
Petroleum Engineering
PHD, Rice University, 1986
Kim, Jihoon, Assistant Professor
Petroleum Engineering
PHD, Stanford University, 2010

King, Michael J, Professor
Petroleum Engineering
PHD, Syracuse University, 1980

Laprea Bigott, Marcelo, Professor of the Practice
Petroleum Engineering
PHD, Texas A&M University, 1979

Lee, William J, Professor
Petroleum Engineering
PHD, Georgia Institute of Technology, 1963

Liang, Jenn T, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1988

Maggard, Bryan, Senior Lecturer
Petroleum Engineering
PHD, Texas A&M University, 2000

McCain, William D, Visiting Professor
Petroleum Engineering
PHD, Georgia Institute of Technology, 1964

McLeroy, Priscilla G, Professor of the Practice
Petroleum Engineering
MEN, Stanford University, 1986

McVay, Duane A, Professor
Petroleum Engineering
PHD, Texas A&M University, 1994

Moridis, George J, Professor
Petroleum Engineering
PHD, Texas A&M University, 1987

Morita, Nobuo, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1974

Nascentes Alves, Ibere, Professor of the Practice
Petroleum Engineering
PHD, University of Tulsa, 1991

Nasr-El-Din, Hisham A, Professor
Petroleum Engineering
PHD, University of Saskatchewan, 1984

Nasrabadi, Hadi, Assistant Professor
Petroleum Engineering
PHD, Imperial College London, United Kingdom, 2006

Noynaert, Samuel F, Assistant Professor
Petroleum Engineering
PHD, Texas A&M University, 2013

Rodrigues De Paula Lima, Heitor, Professor of the Practice
Petroleum Engineering
PHD, Texas A&M University, 1998

Schechter, David S, Associate Professor
Petroleum Engineering
PHD, Brisol University, 1989

Schubert, Jerome J, Associate Professor
Petroleum Engineering
PHD, Texas A&M University, 1999

Sliva, Catherine A, Associate Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1980

Sliva, Glenn M, Associate Professor of the Practice
Petroleum Engineering
BS, Texas A&M University, 1981

Smith, Terri S, Lecturer
Petroleum Engineering
MA, California State University, Bakersfield, 1993

Valko, Peter P, Professor
Petroleum Engineering
PHD, Institute of Catalysis, 1981

Voneiff, George W, Professor of the Practice
Petroleum Engineering
MS, Texas A&M University, 1992

Weijermars, Rudy, Professor
Petroleum Engineering
PHD, University of Uppsala, Sweden, 1987

Wu, Kan, Assistant Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 2014

Zhu, Ding, Professor
Petroleum Engineering
PHD, The University of Texas at Austin, 1992

**Majors**

- Bachelor of Science in Petroleum Engineering (http://catalog.tamu.edu/undergraduate/engineering/petroleum/bs)

**Minors**

- Petroleum Engineering Minor (http://catalog.tamu.edu/undergraduate/engineering/petroleum/minor)

**Certificates**

- Energy Engineering Certificate (http://catalog.tamu.edu/undergraduate/engineering/petroleum/energy-engineering-certificate)
Courses

PETE 201 Introduction to Petroleum Engineering
Credit 1. 1 Lecture Hour.
Overview and history of the petroleum industry and petroleum engineering; nature of oil and gas reservoirs, exploration and drilling, formation evaluation, well completions and production, surface facilities, reservoir mechanics, improved oil recovery; impact of ethical, societal, environmental considerations; career development resources, including professional society.
Prerequisite: Approval of department head.

PETE 225 Introduction to Drilling Systems
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Introduction to petroleum drilling systems, including fundamental petroleum engineering concepts, quantities and unit systems, drilling rig components, drilling fluids, pressure loss calculations, casing, well cementing, and directional drilling.
Prerequisites: Grade of C or better in ENGR 112, MATH 152 and PHYS 218.

PETE 285 Directed Studies
Credits 1 to 4. 1 to 4 Other Hours.
Special problems in various areas of petroleum engineering assigned to individual students or to groups.
Prerequisites: Approval of department head.

PETE 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of petroleum engineering. May be repeated for credit.
Prerequisite: Approval of instructor.

PETE 291 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in petroleum engineering. May be taken two times for credit. Registration in multiple sections of this course is possible within a given semester.
Prerequisites: Freshman or sophomore classification and approval of instructor.

PETE 300 Summer Practice
Credits 0.
Required. No Credit. Industry practice to familiarize the petroleum engineering student with practices and equipment of the petroleum industry. Approval of advisor required.

PETE 301 Petroleum Engineering Numerical Methods
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Use of numerical methods in a variety of petroleum engineering problems; numerical differentiation and integration; root finding; numerical solution of differential equations; curve fitting and interpolation; computer applications; introduction to the principles of numerical simulation methods.
Prerequisites: MATH 308, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 310 Reservoir Fluids
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Thermodynamic behavior of naturally occurring hydrocarbon mixtures; evaluation and correlation of physical properties of petroleum reservoir fluids including laboratory and empirical methods.
Prerequisites: Grade of C or better in CHEM 107 and CHEM 117; MATH 251, MEEN 315, PETE 311.
Corequisite: MATH 308.

PETE 311 Reservoir Petrophysics
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Systematic theoretical and laboratory study of physical properties of petroleum reservoir rocks; lithology, porosity, elastic properties, strength, acoustic properties, electrical properties, relative and effective permeability, fluid saturations, capillary characteristics and rock-fluid interactions such as adsorption and absorption.
Prerequisites: MATH 251; PHYS 208 with a grade of C or better.
Corequisite: GEOL 104.

PETE 314 Transport Processes in Petroleum Production
Credits 3. 3 Lecture Hours.
Basics and applications of fluid mechanics (statics; mass, energy, momentum balances; laminar and turbulent flow, Reynolds number, Moody diagram; non-Newtonian fluid flow; multi-phase flow; flow in porous media, non-Darcy flow); heat transfer (heat conduction, convection, heat exchangers); emphasis on analogies and similarities within mass, energy and momentum transport.
Prerequisites: MEEN 315, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 321 Formation Evaluation
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Well-log interpretation for formation evaluation of hydrocarbon-bearing reservoirs; basic rock physics principles; theory of tool operation; analysis of open hole logs and core measurements to estimate hydrocarbon reserves and petrophysical properties of the formation such as porosity, net pay thickness, water/hydrocarbon saturation, permeability and saturation-dependent capillary pressure; formation evaluation of clay-free and shaly-sand formations as well as basic introduction to formation evaluation of organic-shale formations.
Prerequisites: PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 322 Geostatistics
Credits 3. 3 Lecture Hours.
Introduction to geostatistics; basic concepts in probability and univariate statistics; bivariate statistics and spatial relationship; covariance and correlation; second order stationarity; variogram estimation and modeling; spatial estimation and reservoir modeling; simple and ordinary kriging; uncertainty analysis; estimation versus conditional simulation; sequential Gaussian simulation.
Prerequisites: Senior classification, petroleum engineering majors only; or approval of instructor.

PETE 323 Fundamentals of Reservoir Engineering
Credits 3. 3 Lecture Hours.
Determination of reserves; material balance methods; aquifer models; fractional flow and frontal advance; displacement, pattern and vertical sweep efficiencies in waterfloods; enhanced oil recovery processes; design of optimal recovery processes; introduction and performance analysis of unconventional reservoirs.
Prerequisites: PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.
PETE 324 Well Testing
Credits 3. 3 Lecture Hours.
Analysis of well performance under varied reservoir conditions including evaluation of unsteady, pseudo-steady and steady state flow; well testing methods used to determine well and reservoir parameters; applications to conventional and unconventional wells producing gas and/or liquids; fundamentals of preparing and operating well test equipment to monitor, measure and gather samples for evaluating well performance.
**Prerequisites:** PETE 301, PETE 310, PETE 311; GEOL 404, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 325 Petroleum Production Systems
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Petroleum operation and oil field equipment including onshore and offshore production systems; wellbore inflow and outflow and backpressure analysis; downhole completion and sand control equipment; artificial lift equipment and design; stimulation, workover/completion nomenclature; flow assurance; produced fluids, fluid separation and metering, safety systems, pressure boosting and monitoring.
**Prerequisites:** PETE 301, PETE 310, PETE 314, junior or senior classification, petroleum engineering majors only; or approval of instructor.

PETE 335 Technical Presentations I
Credit 1. 1 Lecture Hour.
Preparation of a written technical paper proposal on a subject related to petroleum technology and an oral presentation of the proposal in a formal technical conference format.
**Prerequisites:** COMM 203, COMM 205 or ENGL 210; junior or senior classification.

PETE 337 Junior Student Paper Contest
Credits 0.
No Credit. Presentation of a technical proposal on a subject related to petroleum technology judged by petroleum professionals at the junior level departmental student paper contest. Must be taken on a satisfactory/unsatisfactory basis.
**Prerequisite:** PETE 335.

PETE 353 Petroleum Project Evaluation
Credits 3. 3 Lecture Hours.
Economic analysis and investment decision methods in petroleum and mineral extraction industries; depletion, petroleum taxation regulations, and projects of the type found in the industry; mineral project evaluation case studies.
**Corequisites:** PETE 301, PETE 310.

PETE 355 Drilling Engineering
Credits 3. 3 Lecture Hours.
Design and evaluation of well drilling systems; identification and solution of drilling problems; wellbore hydraulics, well control, casing design; well cementing directional drilling, offshore drilling.
**Prerequisites:** CVEN 305, PETE 225, PETE 314;
**Corequisites:** PETE 321, PETE 325.

PETE 401 Reservoir Simulation
Credits 2. 1 Lecture Hour. 3 Lab Hours.
Solution of production and reservoir engineering problems using state-of-the-art commercial reservoir simulation software, using data commonly available in industry; emphasis on reservoir description, reservoir model design and calibration, production forecasting and optimization, economic analysis and decision making under uncertainty.
**Prerequisites:** PETE 310, PETE 321, PETE 323, PETE 324, PETE 353.

PETE 402 Integrated Asset Development
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Capstone design encompassing previously acquired skills; project teams formed to solve practical petroleum engineering problems using current tools; technical content of the projects may include any combination of drilling and completion, formation evaluation, inflow/outflow design and analysis, and application of reservoir engineering principles.
**Prerequisites:** PETE 355, PETE 401, PETE 404, PETE 410.

PETE 404 Integrated Reservoir Modeling
Credits 3. 3 Lecture Hours.
Geophysical, geological, petrophysical and engineering data with geostatistical methods to create reservoir descriptions for dynamic reservoir modeling (simulation); geostatistical concepts such as variogram modeling, kriging and sequential Gaussian simulation; combines several techniques to quantify uncertainty in a realistic dynamic reservoir simulation.
**Corequisite:** PETE 401.

PETE 406 High Performance Drilling Design and Operational Practices
Credits 3. 3 Lecture Hours.
Preparation in achieving differentiating drilling performance in the most complex wells; includes training in the underlying physics of each type of performance limiter and real time and engineering practices to address the limitation; performance management workflows and change models required to effectively change the way organizations conduct work essential in achieving higher performance.
**Prerequisite:** PETE 355.

PETE 408 Probabilistic Reserves Evaluation
Credits 3. 3 Lecture Hours.
Oil and gas reserves definitions and reporting regulations; probabilistic reserves estimation methods; unconventional resources characterization; reserves valuation techniques.
**Prerequisite:** PETE 353 or approval of instructor.

PETE 409 Enhanced Oil Recovery
Credits 3. 3 Lecture Hours.
Fundamentals and theory of enhanced oil recovery; polymer flooding, surfactant flooding, miscible gas flooding and steam flooding; application of fractional flow theory; strategies and displacement performance calculations.
**Prerequisites:** PETE 310 or approval of instructor.

PETE 410 Production Engineering
Credits 3. 3 Lecture Hours.
Fundamental production engineering design, evaluation and optimization for oil and gas producing wells; well deliverability; formation damage and skin analysis; well completion selection; technologies that improve oil and gas well performance including artificial lift and well stimulation.
**Prerequisites:** PETE 321, PETE 323, PETE 324, PETE 325.

PETE 416 Solving Common Production Engineering Problems
Credits 3. 3 Lecture Hours.
Application of petroleum engineering tools, methods and techniques to solve real problems that petroleum engineers encounter in producing individual wells; focus primarily on problems associated with single-phase gas wells and uses Microsoft Excel to solve many of these problems.
**Prerequisite:** PETE 410.
PETE 418 Deterministic Reserves Evaluation
Credits 3. 3 Lecture Hours.
Oil and gas reserves definitions and reporting regulations; deterministic estimation methods; unconventional resources characterization; reserves valuation techniques.
Prerequisite: PETE 353 or approval of instructor.

PETE 435 Technical Presentations II
Credit 1. 1 Lecture Hour.
Preparation of a written technical paper on a subject related to petroleum technology and an oral presentation of the paper in a formal technical conference format.
Prerequisites: PETE 337.

PETE 437 Senior Student Paper Contest
Credits 0.
No credit. Presentation of a technical petroleum engineering topic judged by petroleum professionals at the senior level departmental student paper contest. Must be taken on a satisfactory/unsatisfactory basis.
Prerequisite: PETE 435 or concurrent enrollment.

PETE 458 Energy and Sustainability
Credits 3. 3 Lecture Hours.
Energy resources and use with emphasis on long-term sustainability; considers fossil, nuclear and alternative energy sources, electricity and transportation, energy conversions, energy efficiency, energy security, energy policy and environmental impact.

PETE 485 Directed Studies
Credits 1 to 5. 1 to 5 Other Hours.
Special problems in various phases of petroleum engineering assigned to individual students or to groups.
Prerequisites: Junior or senior classification and approval of department head.

PETE 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified field of petroleum engineering. Approval of instructor. May be repeated for credit.

PETE 491 Research
Credits 1 to 4. 1 to 4 Other Hours.
Research conducted under the direction of a faculty member in petroleum engineering. May be taken two times for credit. Registration in multiple sections of this course is possible within a given semester.
Prerequisites: Junior or senior classification and approval of instructor.