Petroleum Engineering

School of Mineral Engineering
Department of Petroleum Engineering

Degrees: B.S., M.S.

Minimum Requirements for Degrees: B.S.: 134 credits; M.S.: 30-36 credits

Petroleum engineering offers a unique look at the challenging problems confronting the petroleum industry. This program requires an understanding of many disciplines including mathematics, physics, chemistry, geology and engineering science. Courses in petroleum engineering deal with drilling, formation evaluation, production, reservoir engineering, computer simulation and enhanced oil recovery.

The curriculum prepares graduates to meet the demands of modern technology while emphasizing, whenever possible, the special problems encountered in Alaska. Located in one of the largest oil-producing states in the nation, the UAF petroleum engineering department offers one of the most modern and challenging degree programs available.

The M.S. program is intended to provide the student with an advanced treatment of petroleum engineering concepts. Students may choose either a thesis or non-thesis option. Research and teaching assistantships are available.

An interdisciplinary doctoral degree program is offered with specialization in petroleum engineering for qualified students. Contact the graduate program coordinator or the petroleum engineering department for more information.

UNDERGRADUATE PROGRAM

MAJOR

Petroleum Engineering—B.S. Degree

1. Complete the general university requirements (page 28). (As part of the core curriculum requirements, complete: MATH 200X, CHEM 103X, CHEM 106X, and LS 101X.)

2. Complete the B.S. degree requirements (page 34). (As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X and PHYS 212X.)

3. Complete the following program (major) requirements:*
   - ES 201—Computer Techniques ................................................. 3
   - ES 208—Mechanics ................................................................. 4
   - ES 331—Mechanics of Materials .............................................. 3
   - ES 341—Fluid Mechanics ........................................................ 1
   - ES 346—Basic Thermodynamics ............................................ 3
   - GE 261—General Geology for Engineers (3)
   - or GEOS 101X—The Dynamic Earth (4) .................................. 3-4
   - GEOS 370—Sedimentary and Structural Geology for Petroleum Engineers ......................................................... 4
   - PETE 103—Survey of Energy Industries ................................... 1
   - PETE 104—Fundamentals of Petroleum ................................. 1
   - PETE 205—Fundamentals of Drilling Practices .......................... 1
   - PETE 206—Introduction to Petroleum Production .................. 3
   - PETE 301—Reservoir Rock and Fluid Properties ................. 4
   - PETE 302—Well Logging ......................................................... 3
   - PETE 303W—Reservoir Rock and Fluid Properties Laboratory .... 1
   - PETE 407—Petroleum Production Engineering .......................... 3
   - PETE 411W—Drilling Fluids Laboratory .................................... 1
   - PETE 421—Reservoir Characterization ...................................... 3
   - PETE 426—Drilling Engineering .............................................. 3
   - PETE 431—Natural Gas Engineering ......................................... 2
   - PETE 456—Petroleum Evaluation and Economic Decisions ........ 3
   - PETE 466—Petroleum Recovery Methods .................................. 3
   - PETE 476—Petroleum Reservoir Engineering ......................... 3
   - PETE 478—Well Test Analysis ................................................ 2
   - PETE 481W—Well Completions and Stimulation Design .......... 3
   - PETE 487A—Petroleum Project Design** ................................ 1
   - PETE 487BW,O—Petroleum Project Design .............................. 1
   - PETE 489—Reservoir Simulation ............................................ 2
   - Engineering elective*** ......................................................... 3
   - Technical elective**** ......................................................... 3

4. Complete the following program (major) requirements:
   - MATH 202X—Calculus .......................................................... 4
   - MATH 302—Differential Equations ......................................... 3
   - MATH 310—Numerical Analysis ............................................. 3

5. Complete the Fundamentals of Engineering Exam (as approved by the Board of Architects, Engineers and Land Surveyors).

6. Minimum credits required .................................................. 134

* Student must earn a C grade or better in each course.
** PETE 487A is prerequisite for PETE 487B. Must take both courses to meet the oral communication and writing intensive requirements.
*** As approved by advisor (e.g. ME 416 or ES 307).
**** As approved by advisor (e.g. CE 603).
GRADUATE PROGRAM
Petroleum Engineering—M.S. Degree
1. Complete the following admission requirement:
   a. Complete a B.S. degree in engineering or the natural sciences.
2. Complete the general university requirements (page 43).
3. Complete the master’s degree requirements (page 46).
4. Complete the thesis or non-thesis requirements:

Thesis
a. Complete 1 course from each of the following groups:
   Group 1. Drilling and production courses:
   PETE 607—Advanced Production Engineering ........................................ 3
   PETE 666—Drilling Optimization ............................................................. 3
   PETE 685—Non-Newtonian Fluid Mechanics ......................................... 3
   PETE 689—Multiphase Fluid Flow in Pipes ......................................... 3
   Group 2. Reservoir engineering/well test analysis/reservoir simulation courses:
   PETE 610—Advanced Reservoir Engineering ........................................ 3
   PETE 661—Applied Well Testing ............................................................ 3
   PETE 663—Applied Reservoir Simulation ............................................. 3
   PETE 683—Natural Gas Processing and Engineering .......................... 3
   Group 3. Enhanced oil recovery/waterflooding courses:
   PETE 630—Water Flooding ................................................................. 3
   PETE 662—Enhanced Oil Recovery ....................................................... 3
   PETE 665—Advanced Phase Behavior ............................................... 3
   PETE 670—Fluid Flow Through Porous Media ................................... 3
   Group 4. Engineering/technology courses:
   CE 603—Arctic Engineering ................................................................. 3
   PETE 680—Horizontal Well Technology ............................................. 3
   PETE 684—Computational Methods in Petroleum Engineering ......... 3
   b. Complete the following:
   PETE 699—Thesis .............................................................................. 6
   Elective courses* ................................................................................ 12
   c. Minimum credits required .......................................................... 30

Non-Thesis
a. Complete 1 course from each group in the thesis option. ............ 12
b. Complete the following:
   PETE 698—Engineering Project .......................................................... 6
   Electives* .......................................................................................... 18
c. Minimum credits required .......................................................... 36

* Electives are chosen with approval of graduate advisory committee.