PETROLEUM ENGINEERING

PETE

1010 Introduction to Petroleum Engineering (3) F Scientific bases of petroleum geology and chemistry, exploration, drilling, production, reservoir engineering, and refining.

1060 Use of Microcomputers in Petroleum Engineering (2) S Prereq.: PETE 1010, credit or registration in MATH 1350, and consent of department. 6 hrs. lab. Computer network, operating systems, high-level programming languages, word processing, electronic spread sheets, and two-dimensional drawing, applications to elementary petroleum engineering problems.

2031 Reservoir Rock Properties (3) F Prereq.: PETE 1060, MATH 1552 and credit or registration in PHYS 2101. Physical properties of reservoir rock related to the production of oil and gas.

2032 Reservoir Fluid Properties (3) S Prereq.: PETE 2031 and credit or registration in PHYS 2102. Physical and chemical properties of petroleum reservoir fluids related to production of oil and gas.

2034 Rock and Fluid Properties Laboratory (1) S Prereq.: credit or registration in PETE 2032. 3 hrs. lab.

3002 Communicating Petroleum Engineering Technology (3) F Prereq.: ENGL 1002, junior standing in the College of Engineering, and permission of department. Communication skills including technical writing, public speaking, group management, and computer usage applied to petroleum engineering topics.

3025 Economic Aspects of Petroleum Production (3) F Prereq.: PETE 2032 and ECON 2030. Mineral ownership and leasing in Louisiana; production decline curve analysis; profitability analysis; risk analysis; evaluation of petroleum properties.

3036 Well Logging (3) F Prereq.: EE 2950, PETE 2034, and PHYS 2102. Qualitative and quantitative formation evaluation by means of electric, acoustical, and radioactive well logs.

3037 Petroleum Field Operations (1) F Prereq.: credit or registration in PETE 3036. 3 hrs. lab. Operation required for well logging; cement design and testing; subsurface pressure measurements; well surveys; and cleaning of drilling fluids.

3053 Petroleum Engineering Aspects of Subsurface Geology (3) S Prereq.: IE 1001, GEOG 1003 and 1601, and PETE 3025 and 3036; or senior status in geology. Engineering aspects of petroleum geology; interpretation of subsurface data; reservoir mapping; determination of reservoir volume.

3pr1 Independent Research (1-2) F,S,Su May be taken for a max. of 3 sem. hrs. of credit. Number of hours, outline of proposed work, and name of faculty supervisor must be stated at time of registration. Individual research or engineering studies with faculty supervision.

4045 Drilling Engineering (3) F Prereq.: CHEM 1212, CE 2200 and 3400, CE 2460 or ME 3133, ME 3333, PETE 3053, and credit or registration in ENGL 3002 or PETE 3002. Drilling process, including equipment and performance; well pressure control and buoyancy; geology, circulation pressure, and optimum hydraulics of drilling fluids; oil well casing design and cementing techniques.

4046 Well Design-Production (3) S Prereq.: PETE 4045 and senior standing in College of Engineering. Analysis and design of well production systems; rod pumping, gas lift, hydraulic fracturing, surface separation, and treating equipment.

4051 Reserve Estimation and Reservoir Management (3) F Prereq.: PETE 3053, and credit or registration in PETE 4045 and PETE 3002 or ENGL 3002. Quantitative and qualitative prediction of reservoir performance and water-drive reservoir systems by material balance.

4052 Testing of Oil and Gas Wells (3) S Prereq.: PETE 4051 and senior standing in College of Engineering. Applications of unsteady-state fluid flow in porous media; pressure draw-down and build-up tests; conventional and type-curve well test analysis.

4056 Numerical Simulation of Improved Recovery Processes (3) S Prereq.: MATH 2057 and 2065, and credit or registration in PETE 4052. Use of computer simulation to predict oil and gas reservoir performance and to design enhanced recovery processes.

4057 Petroleum Production Laboratory (1) F Prereq.: credit or registration in PETE 4045. 5 hrs. lab. Instruments, equipment, and systems used in oil and gas production; pollution prevention and safety systems in off-shore production operations.

4058 Reservoir Mechanics Laboratory (1) S Prereq.: credit or registration in PETE 4052. 3 hrs. lab. Accompanies PETE 4052.

4059 Drilling Fluids Laboratory (1) F Prereq.: credit or registration in PETE 4045. 5 hrs. lab. Accompanies PETE 4045.

4060 Prevention of Oil and Gas Well Blowouts (1) S Prereq.: credit or registration in PETE 4045. 3 hrs. lab. Causes and detection of well kicks and the proper handling of these kicks to prevent uncontrolled flow (blowout) from the well; methods and techniques currently used in the oil and gas industry.


4085 Surface Handling of Produced Fluids (3) V Prereq.: PETE 2032 and 2034. Operating principles and design criteria for equipment used in field processing of oil and gas, e.g., lean oil gasoline plants, gas dehydration units, gas sweetening units, cryogenic gasoline plants, separators, gas transmission and compression facilities.

4086 Well Design-Drilling (3) V Prereq.: PETE 4045. Design of drilling operations; bit selection and evaluation; mathematical modeling of bitwear and penetration rate; determination of pore pressure and fracture pressure; selection of well casing and casing setting depths; directional drilling; special design considerations for horizontal wells.

4087 Environmental Control in Petroleum Engineering (3) V Prereq.: PETE 4045, 4051, and 4059. Environmental impact and pollution mechanisms in petroleum engineering technologies; basic concepts regarding oilfield waste generation, toxicity, and environmental regulatory process; synergy between process productivity and environmental performance.

4088 Formation Evaluation and Analysis (3) V Prereq.: PETE 4045. Use of different formation evaluation techniques to provide a comprehensive description of reservoir content producibility; drilling fluid and cutting analyses; core analysis; formation tester; drillstem test; analysis of openhole logs by overlay, crossplot, and digital evaluation methods.

4089 Natural Gas Engineering (3) V Prereq.: PETE 4051. Application of reservoir engineering principles and practices to gas and gas-condensate reservoirs; prediction of gas well performance; management of all types of gas reservoirs; underground gas storage.

4241 Special Topics in Petroleum Engineering Design (3) Prereq.: senior or graduate standing and permission of instructor. May be taken for a max. of 6 hrs. credit when topics vary. One or more phases of current petroleum engineering design.

4253 Unitization and Appraisal of Petroleum Properties (3) V Prereq.: PETE 3025, 3053, and 4051. Technical aspects of unitization and evaluation of petroleum properties subject to joint management.

4999 Senior Project (1) S Prereq.: PETE 4045 and 4051. Written and oral presentation required. Theoretical and/or experimental investigation, including a literature review, of an approved topic in petroleum engineering.

7201 Fluid Flow in Porous Media (3) V Prereq.: PETE 4052 and 4056, or equivalent. General hydrodynamic equations for fluid flow through porous media; two-dimensional flow problems and potential theory methods; gravity flow systems; two-fluid systems; systems of nonuniform permeability; multiple well systems using computerized streamline tracking methods.

7202 Advanced Well Testing Theory and Analysis (3) V Prereq.: PETE 4051 and 4052 or equivalent. Unsteady-state flow of reservoir fluids in porous media; application of theory to pressure buildup analysis, well interference testing, pulse testing, pressure draw down analysis, drill stem testing, and water influx prediction.

7211 Production System Analysis (3) V Prereq.: CE 2200, ME 3333 and PETE 4046 or equivalent. Use of multiphase flow correlations to determine flow rates and pressure traverses in flowing oil wells, gas-condensate wells, gathering systems, and pipe lines; applications of correlations to the design of gas lift systems.

7212 Well Completion Design (3) V Prereq.: PETE 4046 or consent of instructor. Systems analysis for optimum production by designing best combination of tubing, flow lines, choke sizes, perforation density, and separator pressure; inflow performance of reservoirs; well completion techniques; gravel packing; tubing effects.

7221 Drilling Data Acquisition and Processing (3) V Prereq.: PETE 4045, 4060, and 4086 or equivalent. Mud and surface drilling data acquisition and processing; downhole data acquisition and while drilling; data analysis.

7222 Downhole Production Fluid Dynamics (3) V Prereq.: PETE 4047 and 4085. Wireline sideward core and fluid recovery; data analysis and completion techniques; thermodynamic properties of fluids; downhole production data acquisition and interpretation; cased hole formation evaluation.

7231 Nonthermal Methods of Enhanced Oil Recovery (3) V Theory and field practice related tomiscible displacement processes and chemical and polymer flooding techniques.

7232 Thermal Methods of Oil Recovery (3) V Theory of heat transfer and heat generation applied to the performance prediction of oil recovery by such field
processes as forward and reverse *in situ* combustion, continuous and cyclic hot fluid injection, and production well heating.

7241, 7242 Selected Topics in Advanced Petroleum Engineering (3,3) V May be repeated for credit when topic varies; a total of 12 sem. hrs. of credit may be earned in these two courses.

7256 Special Problems in Petroleum Engineering (1-6) F,S,Su May be taken for a max. of 6 sem. hrs. of credit. Individual study and research.

7280 Mathematical Simulation of Petroleum Reservoir Performance (3) V Prereq.: PETE 4056 or equivalent; and PETE 4051 and 4052. Development and application of mathematical models for predicting petroleum reservoir performance, including multiphase fluid flow in three dimensions.

7999 Seminar (1) All graduate students are expected to attend this course every semester. Only 1 sem. hr. of credit will be allowed towards the degree. Pass/Fail grading.

8000 Thesis Research (1-12 per sem.) “S”/“U” grading.

9000 Dissertation Research (1-12 per sem.) “S”/“U” grading.