

THIRD YEAR

Code	Subject		Week/Hour						Units
			First Term			Second Term			
			Th.	Tut.	Lab.	Th.	Tut.	Lab.	
PE300	Petroleum Reservoir Eng. I	هندسة المكامن ١	3	1	2	3	1	2	8
PE302	Petroleum Drilling Eng. I	هندسة الحفر ١	3	1	2	3	1	2	8
PE304	Petroleum Production Eng. I	هندسة الإنتاج ١	2	1	-	2	1	-	4
PE306	Well Logging	تخطيط آبار	3	1	-	3	1	-	6
PE308	Petroleum Engineering Economics	اقتصادي الهندسة النفطية	2	-	-	2	-	-	4
GE302	Engineering Mathematics	رياضيات هندسية	3	1	-	3	1	-	6
GE310	Technical English	لغة انكليزية تقنية	2	-	-	2	-	-	4
GE301	Geophysics	جيوفيزياء	2	1	-	-	-	-	2
GE303	Engineering Statistics	احصاء هندسي	-	-	-	2	1	-	2

Department of Petroleum Engineering

The Syllabus

The following is the syllabus of the subjects in the department Curriculum.

THIRD YEAR :

PE 300 Petroleum Reservoir Engineering I

Types of traps; Fluids distribution; Types of oil reservoirs; Porosity, compressibility; permeability; Poueseli law, Kozeny Equation, Darcy's law; measurements of permeability, Klinkenberg effect; Gas flow equation; Radial flow; Productivity equation; radial flow of gas; average permeability for stratified reservoirs; Flow through channels and fractures; Saturation; Capillary pressure; Wettability; Multiphase flow through porous media; Linear flow (piston like, leaky piston); Effective and relative permeability; Calculation of relative permeability; Fractional flow equation; Buckley-Leverett equation; Gas properties (Boyle and Charles laws; Avogadro law; Dalton law, equation of state); compressibility factor; liquids properties (PVT); viscosity, classification of reservoirs according to P-T diagram, Phase behavior; calculation of bubble point and dew point; behavior of non-ideal liquids; flash and differential degassing; determination of reservoir liquids; properties of formation water; Volumetric calculation of reservoirs; Isobar, Isobach, Isoporosity and bubble maps. Material balance equation; Material balance for water drive and gas drive reservoirs; Calculation of reservoir pressures.

PE 302 Petroleum Drilling Engineering I

Introduction to drilling; classification of drilling operations; Properties and functions of drilling fluid; types and properties of clay in water; types of drilling fluids; drilling hazards dependent on mud control; drilling mud calculations, drilling methods (cable tool drilling, rotary

drilling), basic component of rotary drilling equipment; drilling string and accessories; types of bits; casing of oil wells; functions of casing, types of casing, strings, parameters of casing design, selection of casing and bit types, design of string, graphical design of casing; cementing of oil wells, classification and properties of cements, classification of cementing operations, cementing equipment, methods and calculations of cementing; Hydraulics of primary cementing operations.

PE 304 Petroleum Production Engineering I

Well completion operations (parameter of design, completion methods, equipment, completion fluids); perforation of oil and gas wells (perforation methods, selection of perforation intervals); water and gas coning; methods for determining oil production rate without coning; completion efficiency, drill stem test (DTS) (test method, equipment, pressure versus time curve, theory of pressure buildup, reservoir properties obtained, depletion); Helical buckling of tubing (forces, homogeneous completion, packers permitting free and limited motions, compound completion of wells); surface gathering systems (types of gathering systems, behavior of fluid flow, flow lines, essential flowing lines, valves); separation of oil, gas, & water (types of separators, components of separators and functions); oil storage (storage tanks and accessories, calibration, measurement of liquid level); Production by pumps (sucker and submersible pumps).

PE 306 Well Logging

Basic rock properties, petrophysics; SP log; conventional resistivity log, induction log; lateral log, macro resistivity log, sonic log, density log, neutron log, gamma ray log, TDT log, CBL log and quick method in (HC) detection.

PE 308 Petroleum Engineering Economics

Oil and gas reserve, organizations of petroleum exporting and importing countries, international supply and demand of petroleum, classification of petroleum, petroleum pricing, alternative energy, international strategy of energy, time value of money, types of interest rates, rate of return, methods of engineering decisions, depreciation, depletion, amortization, taxation, inflation, sensitivity analysis of engineering projects, risk analysis production decline curves, evaluation of future production of oil and gas wells and ,Expenditure and Net present value.

GE 302 Engineering Mathematics

Ordinary differential equations, partial diff. equations, solutions of ordinary diff. Equations, applications of first and second order ordinary diff. Equations; solutions by **Laplace transforms; Bessel functions**; Fourier series; Taylor series; numerical methods.

GE 310 Technical English

General study of English language through the use of subjects related to the specialization of the department such as: petroleum industry, petroleum exploration, drilling for oil, recovering oil, oil transportation, oil refinery, careers in the petroleum industry.

PE 301 Geophysics

Gravity prospecting: principles, instruments, field measurements & reductions; interpretations; seismic prospecting: wave propagation, instruments, refraction and reflection methods, interpretation; magnetic prospecting: principles, instruments, measurements & interpretation; airborne magnetometer.

GE 303 Engineering Statistics

Importance of statistics; descriptive and inferential statistics; pictorial description of data; random sample selection; data classifications; frequency distributions; cumulative frequency distributions; graphical representation of data histograms; frequency polygon; measures of probability variation and the binomial distributions; Poisson distribution; normal distribution; correlation and regression analysis.