

King Saud University
College of Engineering
Petroleum and Natural Gas Engineering Department



PGE 491

Petroleum and Natural Gas Economics

اقتصاديات البترول و الغاز الطبيعي

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PGE 491: PETROLEUM AND NATURAL GAS ECONOMICS, 2(2-1-0)

INSTRUCTOR	Professor Musaed N. J. AlAwad
OFFERING:	Required and offered every semester
YEAR/LEVEL:	5/9
PRE-REQUISITES:	None
CO-REQUISITES:	PGE 496
TEXT BOOK	Handouts prepared by the course instructor
REFERENCES:	<ul style="list-style-type: none">• Franklin J. S.: "Economic Evaluation and Investment Decision Methods.", ISBN-13: 978-1878740137, 802 pages, 14th Edition (March 1, 2014).• Thompson & Wright: "Oil Property Evaluation". Anthony J. Tarquin: "Engineering Economy", McGraw-Hill Inc., 1976.• OPEC, OAPEC, IEA and DOE web-sites information.• سيد فتحي أحمد الخولي: "اقتصاديات البترول"، مكتبة دار حافظ للنشر والتوزيع، جدة، المملكة العربية السعودية.• عبدالعزيز بن لعبون: "صناعة النفط في عهد خادم الحرمين الشريفين الملك فهد بن عبدالعزيز"، جامعة الملك سعود.

EVALUATION PLAN Home Works (10%), Mid-term exam 1 (25%), Mid-term exam 2 (25%), Final Exam (40%).

TOPICS COVERED Brief on Islamic Economy Principles, The Importance of Oil and Gas Resources in the Middle East, OPEC, USA, Rest of the World Oil Reserves, Production and Consumption, History of Oil Discovery in Saudi Arabia, Major Saudi Arabia Oil and Gas Fields, Saudi Arabia Oil and Gas Fields List, Saudi Arabia Oil Ministers, Worldwide giant oil and gas fields, Saudi Arabia Geological Column, Crude Oil Classification, Carbon Emission, Carbon Capture, Utilization And Storage (CCUS), Saudi Arabia-Kuwait Neutral (Divided) Zone, Legal Boundaries of Waters and Airspace, Oil and Gas Ownership Types, National and International Oil Companies and OPEC, OPEC, OPEC+, OAPEC and IEA, Swing Produces, Inflation, Depletion, and Energy Sources, Unconventional Oil and Gas Resources, The Difference between Oil Shale, Shale Oil and Shale Gas, Definition of Oil and Gas Reserves, Depletion and Depreciation, Oil Pricing History, Oil Pricing Criterion, OPEC Reference Basket (ORB) Price, Oil Paper and Wet Barrels, Law of Supply and Demand, Law of Oil Equilibrium (Bottom) Price, Engineering Economy, Key Factors For Successful Project, Investment and Economic Limit, Capital Expenditure (CAPEX) and Operating Expenditure (OPEX), Salvage Value (S), Nominal and Effective Interest Rates, Complex Interest Rate, Petroleum Field Exploitation Cost Analysis, Horizontal Time Line Diagram, Formulas for Continuous and Lump Sum Flow of Fund, Mutually Exclusives Selections and Decision Methods, Decision Screening Yardsticks for Economical Projects, Net Present Value (NPV), Minimum Rate of Return (ROR), Payout (Payback) Period (POT), Profit-to-Investment Ratio (Profitability Index, P/I), Field Examples Based On Oil Production Data, Oil and Gas Industry Sectors, Potential Environmental Impacts of Oil and Gas Activities, Risk and Uncertainty in the Oil and Natural Gas Industry, Oil Price Elasticity, Peak Oil Theory, SPE Ethics and Professional Responsibility.

RELATED ABET STUDENTS OUTCOMES (SOs) and NCAAA LEARNING DOMAINS (LDs):

- ❖ **NCAAA-K1:** An ability to gain knowledge of mathematics, basic sciences, general engineering, Islamic values and Arabic literature.
- ❖ **ABET-SO1 (NCAAA-S1):** An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- ❖ **ABET-SO4 (NCAAA-C1):** An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

MAIN COURSE CLOs RELATION TO PROGRAM (ABET) SOs:

CLO1: SO1 An ability to recognize knowledge of basic oil and gas industry economical terms and related international organizations.	SO1 = 100% An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
CLO2: SO1 An ability to evaluate petroleum engineering projects using economic decision yardsticks and make decision among alternatives with consideration of its impact on national and international economics.	SO1 = 100% An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
CLO3: SO4 An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, Risk and Uncertainty.	SO4 = 100% An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.