Oil and Gas Economics Under Uncertainty

Course Description

This course provides detailed discussions and hands-on training for understanding the fundamental concepts required to perform Petroleum Economic Evaluations under uncertainty and risk.

Proven oil and gas price volatility in addition to uncertainty in cost development are variables that need to be addressed during the economic evaluation.

Financial Aspects of Petroleum Exploration and Production are developed through case studies and SPE publications. Real and nominal cash flows analysis, inflation, escalation, discount rate and economic evaluation concepts are paramount in this course.

A chapter of uncertainty and risk analysis is dedicated to show the importance to perform economic evaluation using a probabilistic approach to enhance the decision-making process.

The different types of petroleum production agreements and its variations, Petroleum Fiscal Systems, and fiscal terms are also included along exercises and examples to fully understand the advantage and disadvantage of each type of oil and gas contract.

Participants will also gain knowledge and skills to compute the economic indicators such as Net Present Value (NPV), Internal Rate of return (IRR), Profitability Index (PI), Pay Back period, and how do use them for decision making and scenario ranking. Uncertainty identification, risk assessment, risk analysis, Monte Carlo simulation, and the use of technologies in FDP formulation are fundamental ingredients of this course. Finally, the portfolio theory and scenario optimization processes are presented as fundamental part of the decision-making process.

The course will be supplemented by practical class project example problems, group exercises and interactive group discussion designed to consolidate and reinforce learning and identify and offer solutions to specific problems associated Economic evaluations of oil and gas fields.

Who Should Attend?

This course is designed for professionals involved with economic evaluations, forecasting, and economic decisions in the upstream oil and gas business such as: engineers; assets

managers; reservoir managers; facility managers; project managers from oil and gas government regulatory authorities; joint venture oil and gas operators; joint venture non-operators, and others.

What You Will Gain:

- Understanding the Petroleum Industry and Current Global Challenges in the entire values chain
- Understanding the concepts of time value of money, NPV, IRR, PI and other economic indicators for decision making.
- Understand the difference between uncertainty and risk, probabilistic analysis, descriptive statistics.
- Learning about oil and gas price volatility
- Learning the Financial Aspects of Petroleum Exploration and Production.
- Learning about contracts and regulations for Petroleum Exploration and Production. Petroleum Agreements (Joint Ventures, Production Sharing Agreements, Service Contracts, etc.)
- Understand the Petroleum Project Valuation Techniques: Value, Cash Flow, Free Cash Flow and EBITDA, Depreciation.
- Understand the concept of portfolio theory and its application to decision making
- Using case studies, hands on exercises and interactive group discussion to identify and offer solutions to specific problems associated with Petroleum Economic Evaluations

Training Methodology

The training course will combine lectures (30%) with workshop/work presentations (30%), interactive practical exercises and case studies (20%), supported by video material, software and general discussions (20%)

Course Content

Petroleum Industry Overview, Cash flow components, Capital Expenditure, and Operating expenditures in oil and gas projects

- Oil and gas industry: overview and global significance
- Upstream: exploration and production
- Midstream: transport and storage; liquefied, natural gas (LNG), natural gas processing and conditioning
- Downstream: oil refining, petrochemicals, marketing and distributions

- Current Global Challenges
- Cash flow components
- Capital Expenditure (CAPEX)
- Operating expenditures (OPEX)
- Depreciation Methods
- Practical Session #1 & #2

Time Value of Money, Escalation and Inflation, Reserve Estimation Overview

- Time value of money, present value formula
- Inflation, escalation, real and nominal cash flow
- Economic indicators and yardsticks used to rank asset values
- Overview of petroleum reserves definition and classifications
- Cost recovery mechanisms, depreciation, depletion and amortization
- Practical Session #3 & #4

Upstream Petroleum Economics, Oil and Gas Contracts

- Type of discount rates
- Sunk and decommissioning cost
- Oil and gas price forecasting
- Oil and gas production forecasting
- OPEC role in the Oil and Gas industry
- Introduction to Oil and Gas contracts, concessions, production sharing agreements, joint ventures
- Practical Session #5 & #6

Midstream and Downstream Petroleum Economics

- Oil and gas transportation options and their economics
- Cost and revenue components associated with refineries
- Gross and net refinery margins and net cash values
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Managing and mitigating uncertainty and risk

- Definition of risk and uncertainty
- Applying probabilities to quantify uncertainties
- Main subsurface risks and their impact in surface facilities calculations
- Monte Carlo simulation technique
- Decision tree analysis

- Practical Session #7 & #8

Asset Portfolio theory, efficiency frontier

- Asset Portfolio theory
- Front End Loading (FEL) approach
- Main oil and gas economic exercise: cash flow details in concessions and production sharing contracts
- Practical Session #9 & #10
- Review Course's Key Take-Aways