



Advanced Project Economics, Risk & Decision Analysis



Course Leader

M. A. Mian, P.E.

Petroleum Engineering Consultant

WHAT WILL YOU LEARN?

- Describe the elements of decision analysis process and the respective roles of management and the analysis team
- Be able to understand the continuous probability distributions
- Calculate expected values using Excel and Decision Tree
- Tailor the existing Excel models to handle Monte Carlo simulation
- Build Monte Carlo Simulation model using industry software, run the model and interpret results
- Evaluate investment and design alternatives with decision tree analysis
- Develop and solve decision trees for value of information (VOI) problems
- Be able to present the results of analysis to management in a meaningful way

WHO WILL BENEFIT?

The following oil & gas company personnel will benefit from the knowledge shared in this course.

- Planning managers
- Oil & gas engineers
- Asset, E&P and Project managers
- Commercial managers and Analysts
- Economists, business analysts & business development personnel
- Government officials, legal counsels & negotiators
- Geologists
- Business advisors
- Business Development personnel

COURSE OVERVIEW

This, very intensive, 5-Day course goes beyond the routine deterministic economic evaluation of projects/investments. As the uncertainty in project/investment variables increase so is the need for the application of more sophisticated methods. The expected value analysis and Monte Carlo simulations are becoming popular in almost every industry that is subject to greater uncertainty.

This is a hand-on course in which the participants actually model a variety of problems with decision trees and Monte Carlo simulation. At the end of the course an integrated model is presented, which can be used for upstream economics of full field development.

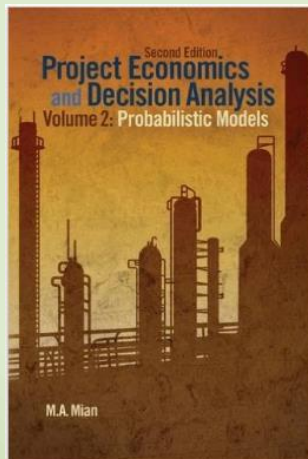
It is expected that the participants have some basic knowledge of probability and its application. Probability distributions express professional judgments about risks and uncertainties and are carried through the calculations. This is a fast-paced course and emphasis is on practical techniques for immediate application.

What will this course cover?

This course will build on the deterministic economic evaluation techniques by incorporating probabilistic occurrence of the most uncertain variables in the project/investment. We will give a recap of the profitability indicators and their appropriate use. The same concepts will now apply to probabilistic profitability indicators. We will learn how to calculate expected values using Excel and decision trees and Monte Carlo Simulation. We will also cover value of information and it is calculated.

COURSE MATERIAL

The course material includes hard copy of more than 250 slides and copy of the course Leaders' book **"Project Economics and Decision Analysis – Probabilistic Models, Vol. 2, 2nd Edition, 2011."** Each delegate will also receive a USB. The USB includes soft copies of the slides, decision trees, Monte Carlo Simulation models and economics models for oil and gas field development, LNG, Refinery and Power Plant.



ABOUT YOUR COURSE LEADER



M. A. Mian, P.E.

B.Sc. in Mechanical Engineering

M.Sc. in Petroleum Engineering

M.Sc. in Mineral Economics

Mian is a Sr. Petroleum Engineering Consultant with Saudi Aramco in Dhahran, Saudi Arabia. He has previously worked with Qatar Petroleum (Doha, Qatar), ZADCO (Abu Dhabi, UAE), Euratex Corporation (Colorado, USA), Kiplinger & Associates (International Energy Consultants in Colorado, USA), and as Independent Consultant in Colorado, USA. He is a registered professional Engineer in the state of Colorado, USA.

Mian has 35 years of diversified experience in petroleum engineering, reservoir engineering, project economics and decision analysis. He had been involved in evaluating multi-billion-dollar oil and gas field development, LNG, GTL, Aluminum smelter, refinery, petrochemical, power and production sharing projects.

Mian is the author of six books:

- Petroleum Engineering Handbook for the Practicing Engineer, Vol. I and Vol. II", PennWell Publishing Co., Tulsa, OK, USA
- Project Economics and Decision Analysis, Vol. I and Vol. II, 2nd Edition, 2011, PennWell Publishing Co., Tulsa, OK, USA
- Tips & Tricks for Excel Based Financial Modeling, Business Expert Press, New York, USA

He has also authored several papers in the Oil & Gas Journal, The Log Analyst, World Oil, SPE Journals, and Oil & Gas Financial Journal.

Mian is one of the pioneers in working with unconventional gas resources. He has extensively dealt with reserves evaluation of tight gas and coalbed methane. Currently he is involved in applying his experience to shale gas resources. He has also served as an expert witness in US Federal court and Energy Commission hearings regarding tight gas pricing classification in the US.

He has delivered lectures in more than 25 countries around the globe. He has always received excellent feedback, as an expert presenter, from the participants of his courses.

PORTFOLIO OF COURSES

- 5-Day – Project Economics, Risk & Decision Analysis
- 5-Day – Designing Efficient Oil & Gas Fiscal Systems
- 5 Day – Advanced Project Economics, Risk & Decision Analysis
- 3-Day – Economics of Production Sharing Agreements
- 3-Day – Development & Economics of Unconventional Resources
- 3-Day – Fundamentals of Oil & Gas
- 3-Day – Decline Curve Analysis, Diagnostic Methods and Performance Forecasting

PUBLICATIONS

- Unnecessary and Avoidable Mistakes in Financial Calculations
- Comparison of Methods used to Calculate Netback Value
- Revisiting the Pitfalls and Misuse of WACC
- Custom Graphs Help Analyze Oil, Gas Operations
- Spreadsheet Programming Simplifies Drilling Calculations
- Program Quickly Solves Trial-and-Error Problems
- Creating Quality, Cost Effective Property Reports
- Predicting the Performance of Tight Gas Reservoirs

COURSES DELIVERED IN

United Kingdom, Italy, Czech Republic, Norway, Sydney, Perth, Adelaide, Brisbane, New Zealand, Singapore, Malaysia, Hong Kong, Pakistan, South Korea, Kazakhstan, UAE, Kuwait, Qatar, Saudi Arabia, Bahrain, Bolivia, Brazil, Canada, Angola, Nigeria, Ghana, Mozambique, Algeria & South Africa.

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DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
<p>Objective of the Course Recap of the Deterministic Concepts</p> <ul style="list-style-type: none"> Why economic evaluation? Typical profitability indicators Types of investment decisions Investment decision-making Excel's financial functions Loan amortization – Excel functions Depreciation – Excel functions Develop Excel sheet to calculate depreciation <p>Use of Additional Tools</p> <ul style="list-style-type: none"> Wells calculator Gas processing flow chart NGLs recovery calculator <p>Management Presentation</p> <ul style="list-style-type: none"> Assumptions Profitability Indicators Sensitivity analysis Waterfall chart Two variable cross plot Three variable cross plot <p>Exercises/Problems</p> <ul style="list-style-type: none"> Gas field development economics Develop two variable cross plot 	<p>Handling Uncertainty in Investments</p> <ul style="list-style-type: none"> Why decision analysis? Handling uncertainty in Capital Investments Tornado chart & spider diagram Variations in Tornado charts Generating Tornado chart Using Excel to generate Tornado chart Using Excel to generate Tornado chart (Alternative) <p>Basic Probability Concepts</p> <ul style="list-style-type: none"> Probability definitions Probability distributions Continuous probability distributions Normal probability graph Lognormal probability graph <p>Expected Value</p> <ul style="list-style-type: none"> Expected value of random variables Expected value calculation Additional Excel functions Sensitivity analysis Sensitivity analysis using Excel <p>Expected Opportunity Loss</p> <ul style="list-style-type: none"> Expected opportunity loss (EOL) EOL calculations Expected profitability index (EPI) EPI sample calculations Risk Index (RI) Mean standard deviation screening method Decision-making <p>Problems/Exercises</p> <ul style="list-style-type: none"> Calculating EV using Excel Calculating EV using Excel (Drill vs Farmout) Sensitivity analysis of dry hole probability using Excel Using Excel to calculate EOL 	<p>LRMC Reconciliation</p> <ul style="list-style-type: none"> LRMC Reconciliation Steps to follow Identify differences in assumptions LRMC reconciliation Generating waterfall chart <p>Decision Trees</p> <ul style="list-style-type: none"> Decision tree description Terminology used in decision tree Solving a decision tree Collapsing decision trees Collapsed decision trees Characteristics of a decision tree Guidelines for designing trees Advantages of decision trees <p>Risk Profiles</p> <ul style="list-style-type: none"> Risk profile Risk profiles & specific strategies Examples of risk profiles Cumulative risk profiles Example of cumulative risk profile Concept of dominance Stochastic dominance <p>PrecisionTree™</p> <ul style="list-style-type: none"> Introduction to PrecisionTree Model settings Decision analysis Sensitivity analysis Decision tree node settings <p>Problems/Exercises</p> <ul style="list-style-type: none"> Drill vs. Farmout Decision Tree Drill vs. Farmout vs. Backin Decision Tree (collapsed tree) Drill vs. Farmout vs. Backin Decision Tree (expanded tree) Waterflood Pilot Evaluation <p>Value of Perfect Information</p> <ul style="list-style-type: none"> Value of information (VOI) Categories of information Characteristics of VOI Expected value of perfect information (EVPI) 	<p>Value of Imperfect Information</p> <ul style="list-style-type: none"> Expected value of imperfect information (EVII) Bayes' theorem Bayesian interpretation Simple illustration of Bayes' theorem Using Bayes' theorem Bayesian revision of probabilities Decision tree for EVII Value of Acquiring Seismic <p>Simulation in Decision Analysis</p> <ul style="list-style-type: none"> What is simulation? Applications of simulation Cumulative distribution function (CDF) Behind the scene calculations Monte Carlo sampling Hypercube sampling Replacing variables by probability distributions Recognizing dependence between variables Guidelines for selecting probability distributions Monte Carlo Simulation <p>Introduction to @RISK</p> <ul style="list-style-type: none"> Useful @RISK functions Truncated probability distributions Is Monte Carlo our Best Option? <p>Simulation Exercises</p> <ul style="list-style-type: none"> Fitting probability distribution to historical data Simulation of rolling a dice Simulating oil and gas reserves Simulating oil and gas reserves (Multiple Simulations) Simulation of cash-flow Simulation of cash-flow (using correlation between oil & gas price) Simulating production forecast Simulating production forecast (using correlations) 	<p>Attitudes Towards Risk</p> <ul style="list-style-type: none"> Expected utility (EU) theory Risk attitudes Risk tolerance Certainty equivalent & Risk premium Decision-making using CE, EU or RP Lottery ticket example Typical utility functions Solving decision tree using utility function <p>Determining Venture Participation</p> <ul style="list-style-type: none"> Dependence of participation factor Gambler's ruin Exponential risk aversion Optimum working interest Portfolio balancing Portfolio balancing exercise <p>Multi-Period Investment Optimization</p> <ul style="list-style-type: none"> Multi-period capital budgeting Using Solver Multi-period budgeting exercise <p>Integrated simulation model</p> <p>Exploration Economics</p> <ul style="list-style-type: none"> Expected Value of Perfect Information Exercise E&P chain of negative consequences 7 Requirements for play analysis 7 Inputs – Prospect vs. Play Shared and local chances Geological chance assessment Probability of commercial success Probability of economic success Calculating Minimum Economic Field Size (MEFS) Program Pe versus dry hole tolerance Exploration success Expected monetary value Complex traps

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Please complete the following Form and e-mail it to mianma@OGKnowledgeShare.com OR Submit the same details via the **Event Registration** on the website www.OGKnowledgeShare.com. We will then send you additional course details along with a detailed course registration Form.

Course Name	<input type="text"/>		
Course Venue	<input type="text"/>	Course Date	<input type="text"/>
Company	<input type="text"/>		
First Name	<input type="text"/>	Last Name	<input type="text"/>
Title	<input type="text"/>		
Email	<input type="text"/>	Phone	<input type="text"/>
Address	<input type="text"/>		
City	<input type="text"/>	State	<input type="text"/>
Postal Code	<input type="text"/>	Country	<input type="text"/>

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ACCREDITATION

The course is accredited by The CPD Standards Office (UK). Each delegate will receive a successful course completion certificate and a certificate of applicable (30 hours) Continuous Professional Development (CPDs) units and 30 Professional Development Units (PDUs) for this course. The delegates will also receive 30 PDU hours. The PDUs fulfill continuing education requirement of PMI Credential holders.

The CPD Standards Office
CPD PROVIDER: 21496
2016 - 2018
www.cpdstandards.com



COURSE FEES AND VENUE

Middle East – US\$ 3,500
All other Locations – US\$ 3,950

Hotel accommodation and travel costs are not included in the fees. The Fees includes refreshments, lunch and course material. Course is held preferably in a 5-star hotel. The final venue selection will depend upon the number of delegates attending the course and availability of the venue. All delegates will be informed about the venue two weeks before the course start date.

Full payment is due within 14 days from date of invoice and before the course commences. Delegates will not be allowed entry to the course if any payments are outstanding. A confirmation letter and invoice will be sent to you on receipt of your booking.

You may substitute delegates at any time as long as reasonable advance notice is given to O&G Knowledge Sharing Platform. For any cancellation received in writing not less than twenty (20) working days prior to the date of the training course, you will receive a full refund less US\$ 150 administration fee and any related bank or credit card charges.

Delegates who cancel the registration less than twenty (20) working days of the date of training course, or who do not attend the course, are liable to pay the full course fee and no refunds will be granted.

In the event that KSP cancels or postpones the course for any reason, the delegates will be given choice to (a) request full refund less applicable credit card or bank charges, (b) attend the same course at the rescheduled date at the same or other venue or (c) receive credit note to be used by any employee of the same company for any other course offered by KSP, which must occur within one year from the date of postponement.

COMPANY GAURANTEE

If Company Payment is selected as the Billing Method, an official letter from the company, signed by HR or responsible Management, stating names of the delegates who will attend the course and the total course fee payment guaranteed by the company to be paid within 30 days upon receipt of invoice from KSP shall be submitted ten (10) working days before the start date of the course.

CHARGES AND FEES

1. For Payment by Direct Telegraphic Transfer, client has to bear both local and oversea bank charges.
2. For credit card payment, there is additional 4% credit card processing fee, which shall be added to the course fee.