PetroSkills®

PETROLEUM RISK and DECISION ANALYSIS

Course Instructor
Tim Nieman or John Schuyler

Course Level
Foundation

Who Should Attend
Geologists, engineers, geophysicists, managers, and planning analysts

You Will Learn How To
- Express, elicit and understand judgments about risks and uncertainties as probability distributions
- Work with probabilities and probability distributions, including revising prior assessments based upon new, imperfect information
- Use expected value as the cornerstone of objective forecasting and decision policy
- Set up decision models to calculate expected value in decision trees, payoff tables, and Monte Carlo simulation
- Interpret model results in proper context for making or recommending a course of action for the decision

About the Course
Good technical and business decisions are based on competent analysis of project costs, benefits and risks. Attendees learn a practical, systematic process for analyzing decisions under conditions of risk and uncertainty. Participants learn to design and solve decision models. In these, probability distributions express professional judgments about risks and uncertainties and are carried through the calculations. Decision tree and influence diagrams provide clear communications and the basis for valuing each alternative. The complementary Monte Carlo simulation technique is also presented and experienced in detail in a hand-calculation exercise.

Decision modeling and basic probability concepts provide the foundation for the calculations. The mathematics is straightforward and mostly involves only common algebra. The emphasis is on practical techniques for immediate application. This is a fast-paced course and recommended for those with strong English listening skills.

This course is intended as the prerequisite for the *Advanced Decision Analysis with Portfolio and Project Modeling* course.

Course Format
Over half of the class time is devoted to exercises, especially hands-on modeling experiences. Topic discussions and instructor software demonstrations complete the days in this concentrated course. The sessions are designed to be informal and participatory. Attendees are encouraged to bring non-proprietary decision problems for discussion or individual work.

Class exercises are designed to allow participants to discover and experience the important concepts. The course notebook includes exercises, discussion text, checklists, calculation routines, and small model listings. Additionally, participants receive three reference textbooks written or co-authored by John Schuyler.

Course Content

Decision Tree Analysis: decision models; low probability, high-consequence events; valuing additional information, flexibility and control; project threats and opportunities • **Monte Carlo Simulation**: Latin hypercube sampling; portfolio problems; optimization; advantages and limitations • **Decision Criteria and Policy**: value measures; multiple objectives; HSE; capital constraint; risk aversion • **Modeling the Decision**: influence diagrams; sensitivity analysis; modeling correlations • **Basic Probability and Statistics**: four fundamental rules, including Bayes' theorem; calibration and eliciting judgments; choosing distribution types; common misconceptions about probability; avoiding biases in estimation • **Expected Value Concept**: foundation for decision policy, pitfalls to avoid • **Implementing Decision Analysis**: problem framing; guidelines for good analysis practice; team analyses; computer tools (discussion and demonstrations); mitigating risks • Evaluating a multi-pay prospect (team exercise).

Examples

Participants are encouraged to bring examples from their work for discussion. Please contact PetroSkills Training if you wish to submit a problem in advance for possible use as a class exercise.

About the Instructors (either would present the course)

TIM NIEMAN is President of Decision Applications, Inc., a San Francisco area based decision analysis consulting firm. His firm performs decision and risk analysis for various organizations facing complex decision problems. His recent oil and gas consulting work includes risk analysis of pipeline routing; risk analysis for deepwater flow assurance; portfolio analysis for budgeting E&P R&D portfolios; and development of methods for assessing new basin entry opportunities. Other recent work includes development of remediation and reuse strategies for impaired properties, including former refineries, manufacturing facilities and pipelines; numerous projects for the Yucca Mountain proposed nuclear waste repository; work for the US Geological Survey on mountain top coal mining, unconventional oil and gas drilling, basin-wide water management and climate change issues; and cancer causation modeling for national health organizations. He teaches various courses on decision analysis and quantitative modeling. Mr. Nieman was formerly Senior Decision Analyst for Geomatrix Consultants, an Oakland based geological and environmental consulting firm. Prior to that, he was Director of Operations for Lumina Decision Systems, a decision analysis consulting and software firm. And prior to that, he spent 14 years with Amoco as a geophysicist, economist, and risk and portfolio analyst. He has a B.S. in geology and an M.S. in geophysics from Michigan State University, and an MBA from Rice University.

JOHN SCHUYLER, CAM CCE CMA CMC CPIM PMP and PE, is a decision analyst, evaluation engineer, and investor. He founded his consulting practice, Decision Precision®, in 1988. He has over 36 years of experience in analysis, consulting, and management, primarily in the energy industry. He has presented over 280 courses in 34 countries since 1989. His focus has been in feasibility analysis, appraisals, corporate planning, and evaluation software development. He was vice president and petroleum engineer with Security Pacific National Bank, planning and evaluation analyst and (later) manager of business systems for Cities Service Co., and senior management consultant with a national accounting firm. John is a member in eight professional organizations and is an author and speaker on modern analysis practices. He holds a BS and an MS in mineral-engineering physics from Colorado School of Mines and an MBA from the University of Colorado. John is the revision author of *Decision Analysis for Petroleum Exploration, 2nd ed.*, author of *Risk and Decision Analysis in Projects, 2nd ed.*, and has written over 40 articles and handbook chapters. His Web site is http://www.maxvalue.com.

In-House Presentations

All courses are available for in-house presentation to individual organizations. In-house courses may be structured the same as the public versions or tailored to meet your requirements. Special courses on virtually any petroleum-related subject can be arranged specifically for in-house presentation. For further information, contact our In-House Training Coordinator at one of the numbers listed below.

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Facsimile	1-832-426-1244
E-Mail	training@petroskills.com

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How to Contact PetroSkills, LLC

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E-Mail	registrations@petroskills.com
World Wide Web	www.petroskills.com
Address	P.O. Box 35448, Tulsa, Oklahoma 74153-0448 U.S.A.

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Management buy-in is essential for successfully applying decision analysis. Either instructor welcomes an opportunity to present an executive seminar if an hour with managers can be arranged sometime during the week. Managers are also welcome to visit the course during session. A one-half day Executive Workshop is available at moderate cost if company executives have time and interest. The key topics in these special sessions include essential concepts, corporate decision policy, how to interpret a decision analysis, and the manager's role in evaluation quality control.

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