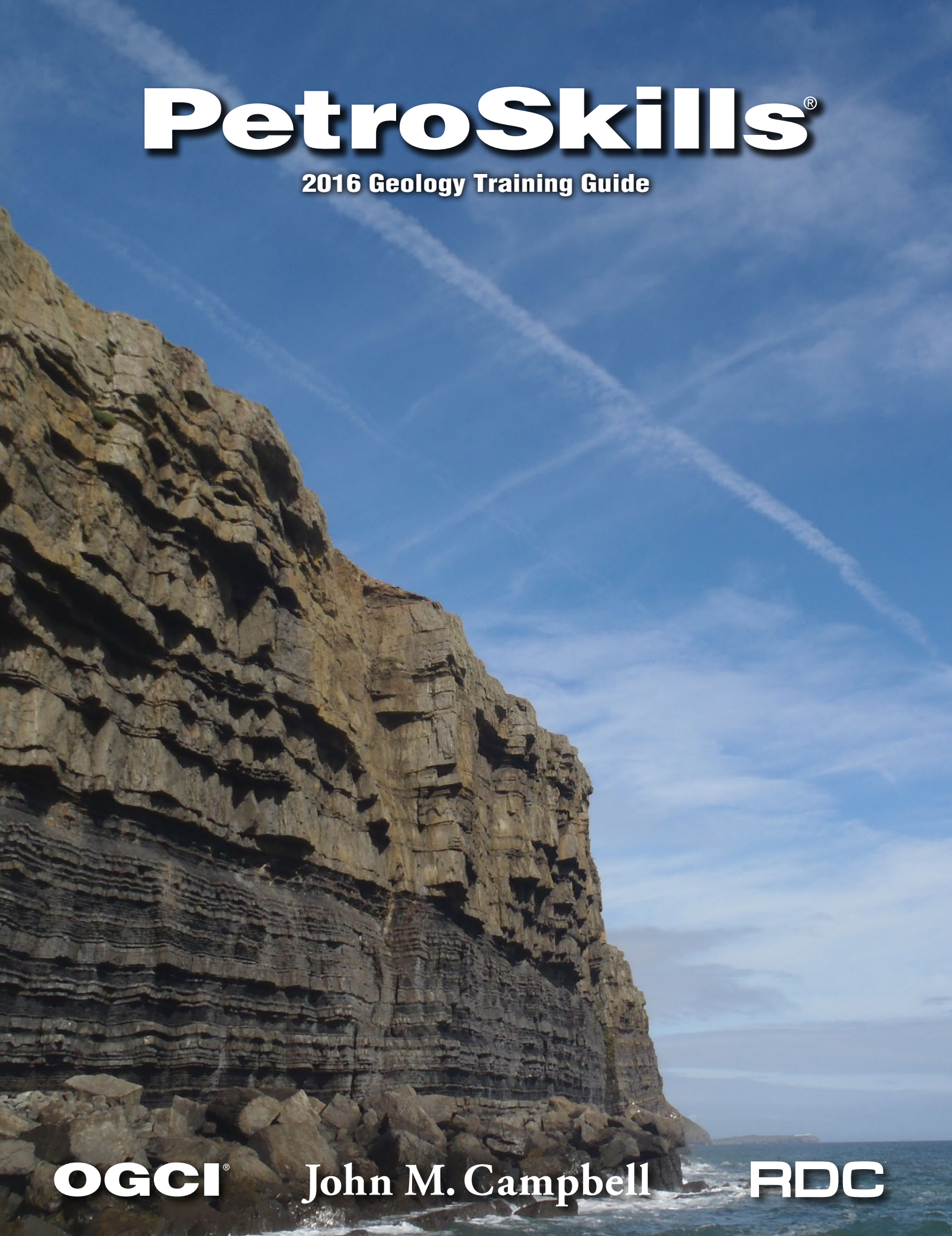
PetroSkills®

2016 Geology Training Guide



OGCI® John M. Campbell RDC

Geology

Course Progression Matrix

The Course Progression Matrix below shows how the Geology courses in this section are structured within each topic, from Basic to Specialized. On either side of the Geology section, you will see courses in associated disciplines for cross-training. These matrices are ideal for building training plans for early career staff or finding the right course to build upon existing knowledge and experience.

As demonstrated by the FIELD TRIP icon next to our course titles, many of our courses include field trips. These courses bring material from the classroom into the field and allow participants to get an up-close view of geological concepts.

The following instructors have been selected and approved by the PetroSkills Curriculum Network:

Mr. Jeff Aldrich
Mr. Peter Bartok
Mr. Chris Bird
Dr. Steven Boyer
Mr. Satinder Chopra
Dr. Bryan Cronin
Mr. John Dillon
Dr. Michael Grammer
Dr. James Granath
Mr. Andrew Harper
Dr. Howard Johnson
Mr. John Keasberry
Mr. Jeff Lelek
Mr. Larry Lens
Dr. Catalina Luneburg
Ms. Randi Martinsen
Dr. Mark McCaffrey
Dr. Clyde Moore
Mr. James Morse
Mr. Larry Moyer
Dr. John Pigott
Mr. Bill Powell
Dr. Dennis Prezbindowski
Dr. John Sneider
Mr. Mehrdad Soltanzadeh
Dr. Tom Temples
Dr. Lawrence Teufel
Dr. William Wade
Mr. Jeff Webber
Dr. Brian Williams

	Geophysics	Geology						Petrophysics	Reservoir, Production and Drilling	Data Management, Business, and Professional Development	Health, Safety, Environment
		Stratigraphy / Structure	Geochemistry	Reservoir Characterization	Basin Analysis	Development Geology	Mapping / GIS				
Specialized	Advanced Seismic Stratigraphy (Page 9)							Wireline Formation Testing and Interpretation (Page 11)	Naturally Fractured Reservoirs (Page 7)		
Intermediate	Introduction to Seismic Stratigraphy (Page 9)	Compressional and Transpressional Structural Styles (Page 5)	Geochemical Techniques for Solving Reservoir Management and Field Development Problems (Page 6)	Deep-water Turbidite Depositional Systems and Reservoirs (Page 5)	Basin Analysis Workshop (Page 5)	Development Geology (Page 5)		Integration of Rocks, Log and Test Data (Page 11)			
	AVO, Inversion, Attributes (Page 9)	Analysis of Structural Traps in Extensional Settings (Page 4)		Integrated Carbonate Reservoir Characterization (Page 6)	Prospect and Play Assessment (Page 6)	Operations Geology (Page 6)		Structural and Stratigraphic Interpretation of Dipmeters and Borehole-Imaging Logs (Page 11)	Reservoir Characterization (Page 13)		
				Outcrop to Simulation - What Takes a Prospect to a Project (see website)				Petrophysics of Unconventional Reservoirs (Page 10)	Integrated Reservoir Modeling (Page 13)	Petroleum Project Management (Page 15)	
Foundation				Geomechanics for Heavy Oil (Page 3)			Mapping Subsurface Structures (Page 3)				
				Carbonate Reservoirs (Page 2)			ArcGIS Coordinate Reference Systems for Petroleum (Page 7)	Well Log Interpretation (Page 10)			
		Sequence Stratigraphy (Page 4)		Sandstone Reservoirs (Page 3)		Production Geology for Other Disciplines (Page 4)		Coring and Core Analysis (Page 10)	Well Test Design and Analysis (Page 12)	Petroleum Risk and Decision Analysis (Page 14)	Applied HSE Management (Page 16)
	Seismic Interpretation (Page 9)	Structural Styles in Petroleum Exploration (Page 4)	Geochemistry: Tools for Effective Exploration and Development (Page 3)	North Sea Petroleum Geology (Page 2)		Horizontal Well Placement in Heavy Oil Reservoirs (Page 3)	ArcGIS Essentials for Petroleum (Page 7)	Foundations of Petrophysics (Page 10)	Production Technology for Other Disciplines (Page 12)	Team Leadership (Page 14)	Applied Environment (Page 16)
										Geomatics: Geodesy and Cartography (Page 14)	Applied Safety (Page 15)
				Evaluating and Developing Shale Resources (Page 8)							
Basic	Geological and Geophysical Characterization of Heavy Oil Resources (Page 2)								Basic Drilling Technology (Page 12)	Basic Petroleum Economics (Page 14)	
	Basic Geophysics (Page 8)	Basic Petroleum Geology (Page 2)							Basic Reservoir Engineering (Page 11)	Introduction to Data Management (Page 13)	Basics of Environment (Page 15)
	Petroleum Geology for Early Career Geoscientists and Engineers (see website)										
	Exploration and Production Process Basics: Understanding the Petroleum Industry Value Cycle (2 weeks) (Page 8)									Essential Technical Writing Skills (Page 13)	Basics of HSE Management (Page 15)
	Basic Petroleum Technology (Page 7)										

Basic Petroleum Geology – BG

BASIC **FIELD TRIP**

What is Basic Petroleum Geology? For all practical purposes it closely resembles the freshman level course that a non-science major at a university would take to satisfy the science requirement. Presentation is oriented toward topics of interest to the petroleum industry. While high school chemistry and physics might help in understanding a very few selected topics, the course is designed for those with no technical training (and those who studiously avoided science in school). Primary objectives of the course are to broaden your geological vocabulary, explain selected geological principles and processes, and describe how certain petroleum reservoirs and source rocks are formed.

DESIGNED FOR

Petroleum industry personnel in need of basic geological training, including engineering, geophysical, technical support, and administrative personnel.

YOU WILL LEARN

- About plate tectonics and petroleum
- About geological time and history
- The fundamentals of rock formation and deformation
- The essentials of various depositional environments and the reservoirs created by them
- The distribution of porosity and permeability in reservoirs produced in different depositional environments
- How rock characteristics are related to modern geological processes and applied to the ancient record
- About petroleum reservoir and source rocks
- Of petroleum origin, migration, and trapping
- How to correlate electric logs and recognize depositional environments on logs
- How to make contour maps and cross sections
- Elements of geophysics and exploration
- How geology bears directly on engineering practices

COURSE CONTENT

Minerals and rocks • Plate tectonics • Geological time • Weathering and erosion • Deposition • Diagenesis • Reservoirs • Structural geology and petroleum • Origin, migration, and trapping of petroleum

2016 Schedule and Tuition / 5 Days

CALGARY, CANADA	13-17 JUN	US$3900+GST
DENVER, US †	9-13 MAY	US$4075
HOUSTON, US	14-18 MAR	US$3940
	3-7 OCT	US$3940
LONDON, UK	16-20 MAY	US$4570+VAT

† includes field trip

Geological and Geophysical Characterization of Heavy Oil Reservoirs – HORC

BASIC

With conventional hydrocarbon resources growing thinner, heavy oil and bitumen are being looked at as the next resource that could be exploited in the near future. As both heavy oil and bitumen are a global resource, they are fast becoming an asset base for many energy companies. Economical development of heavy oil reservoir requires accurate characterization of the rocks as well as the fluids contained therein. As heavy oil properties are different from conventional oil, its exploration and production requires special seismic strategies and rock physics models. Geophysical characterization of heavy oil reservoirs is therefore at the heart of production of this resource.

DESIGNED FOR

Seismic interpreters, seismic processors, stratigraphers, structural geologists, and reservoir engineers.

YOU WILL LEARN

- Evaluation of the available reservoir characterization options, and selection of the options suitable for the project
- To apply the appropriately chosen techniques to your data to extract meaningful information
- To evaluate the application of the various techniques discussed during the course
- The sweet spots within the reservoir zone based on characterization with application of different attributes
- To integrate the different attribute applications to generate a comprehensive characterization of the zone of interest

COURSE CONTENT

Mechanisms for the formation of heavy oil • General phase behavior of hydrocarbons and heavy oil • Properties of heavy oil and rock physics analysis • Geophysical approaches to characterization of heavy oil reservoirs • Measuring and monitoring heavy oil properties • Methods of extraction of heavy oil (CHOPS, SAGD, etc.) • Challenges for heavy oil production • Seismic monitoring of hot and cold heavy oil production • Optimization of Canadian heavy oil production through reservoir characterization • Environmental issues • Jeopardy exercises on each of these units

See website for dates and locations.

North Sea Petroleum Geology: Integrated Classroom, Core Store and Field Analogue on Reservoir Deposystems – NSPG

FOUNDATION **FIELD TRIP**

This course is a G&G-focused course and keeps to the subject areas of regional geology, structural evolution, depositional environments, play types, and specific field case studies for the taught component. An overview of each (clastic) depositional environment is given, followed by related field or reservoir case studies. After the first three days of classroom overview and case study lectures, students go to the core store to examine seven wells: they will have the chance to briefly describe sections from each well to add to their understanding of the environments. Then, during three days in the field in Northumberland, students can investigate most of the environments studied.

DESIGNED FOR

Geologists, geophysicists, petrophysicists, reservoir engineers, drillers, or anyone involved in subsurface reservoir characterization in the North Sea area.

YOU WILL LEARN HOW TO

- Understand the petroleum systems, play styles and history of oil and gas exploration and production in the North Sea
- Realize the structural evolution of the North Sea and its impact on hydrocarbon generation
- Recognize fluvial, aeolian, paralic, and marine clastic and carbonate reservoirs at core, on wire line, and on seismic
- Know related field geology as an overview of reservoir style in the North Sea area

COURSE CONTENT

Overview of the geology of the North Sea; fluvial deposystems • Aeolian and deltaic deposystems • Marine reservoirs • Core store and field trip preparation • Field Trip - Tweed Basin • Field Trip - Northumberland Basin

2016 Schedule and Tuition / 7 Days

ABERDEEN, UK †	11-17 SEP	US$6780+VAT

† includes field trip

Carbonate Reservoirs – PCR

FOUNDATION

This rigorous workshop is a must for geoscientists dealing with exploration for and exploitation of carbonate reservoirs. The seminar emphasizes the complexity of carbonate porosity. Its modification and evolution will be discussed in a sea-level driven sequence stratigraphic framework. Case histories and exercises from around the world will be utilized throughout to illustrate important concepts. These exercises and case histories give the participant experience in developing viable exploration and exploitation strategies for carbonate terrains.

In 2013 a new book, Carbonate Reservoirs, was prepared by Drs. Moore and Wade specifically to accompany this course and is furnished to all course participants.

DESIGNED FOR

Exploration and development geologists, exploration and development managers, and geophysicists as well as engineers with some geologic background will benefit.

YOU WILL LEARN HOW TO

- Recognize basic characteristics of carbonates important to reservoir development
- Understand how sequence stratigraphy can be applied to carbonates and mixed carbonate-siliciclastic systems
- Understand the complexities of carbonate pore systems
- Recognize the nature of carbonate porosity modification during diagenesis and the role of sea-level and climate in porosity modification and gross reservoir heterogeneity
- Develop viable exploration and exploitation strategies in carbonate terrains by working with subsurface datasets

COURSE CONTENT

Basic nature of carbonates • Carbonate facies models • Basic concepts of sequence stratigraphy • Relationship of stratigraphic patterns to changes in subsidence rates • Sequence stratigraphic models including the ramp, the rimmed shelf, the escarpment margin, the isolated platform, and the mixed carbonate-siliciclastic shelf • Characteristics of carbonate pore systems • Diagenesis, porosity evolution, and porosity distribution at the time of burial • The fate of early-formed porosity during burial • The potential value of dolomitization, including by hydrothermal processes • The problem of H_2S in carbonate reservoirs • Natural fractures in carbonates • Case histories and exercises from the Americas, Europe, and Asia • Exploration and exploitation strategies in carbonate and mixed terrains

2016 Schedule and Tuition / 5 Days

HOUSTON, US	23-27 MAY	US$4065

GEOLOGY

Sandstone Reservoirs – SR

FOUNDATION

This course is essential for geoscientists and engineers involved in the exploration and development of clastic reservoirs. It focuses on methods that can be used to improve the prediction of reservoir size, shape, trend, and quality through detailed analysis of depositional environments. The sedimentary characteristics of each of the principal clastic depositional systems are presented in detail, using examples from recent environments, outcrops, cores, wireline logs, and test/production data from oil and gas fields in various parts of the world (United States, North Sea/Atlantic, Africa, Middle East, Far East, etc.). Practical exercises are taken from each of the principal depositional settings and involve detailed mapping, interpretation of core and log characteristics, and integration of data from FMI logs. Emphasis is placed on the application of fundamental sedimentary principles (modern, ancient, and subsurface) to actual subsurface data so that the participants can immediately use the information in their exploration and development activities.

DESIGNED FOR

Geologists, geophysicists, petrophysicists, reservoir and production engineers, exploration-production managers, all team members involved in reservoir characterization, and technicians working with clastic reservoirs. The course provides a refresher in new concepts in this field for geoscientists at a foundation level.

YOU WILL LEARN HOW TO

- Interpret clastic depositional environments using data from cores, cuttings and wireline logs (including FMI)
- Apply new sequence stratigraphic concepts to clastic reservoirs
- Correlate wells using knowledge of depositional environment
- Predict reservoir size, shape, trend and quality

COURSE CONTENT

Genetic stratigraphic analysis • Depositional architecture • Basins and units • Wireline logs and conventional cores • Seismic and sequence stratigraphy • Recognition of depositional systems • Process-response facies models • Integrated genetic stratigraphy • Analysis of clastic depositional systems • Alluvial fan • Fluvial Eolian • Deltaic • Shoreline • Shelf • Deepwater systems • Incised sequences • Shelf margins and linked downslope systems • Characteristic log patterns • Flow units • Prediction of reservoir size, shape, trend, quality • How to select optimum well locations • Lateral continuity and quality of seals • Sedimentary controls on porosity, permeability, saturation • Reservoir exploration and production case histories • Exploration and production scaled case histories

2016 Schedule and Tuition / 5 Days

CALGARY, CANADA	3-7 OCT	US$4000+GST
DENVER, US	11-15 JUL	US$4050
HOUSTON, US	29 FEB-4 MAR	US$4040

Mapping Subsurface Structures – MSS

FOUNDATION

Not just a collection of rules of thumb, this class presents the fundamental concepts and techniques required to accurately construct structure maps in 3D so that you will get the most out of your data. Principles and techniques are illustrated by solving numerous exercises by hand (with drafting tools and a calculator) using strategies and workflows analogous to those that participants will use back at the office using computers. Participants will be prepared to develop more accurate structural models of reservoirs, avoid dry holes, find new traps in old fields, extract the maximum information from exploration wells, and validate or recognize errors in existing interpretations. Dr. Richard Groshong's book, 3D Structural Geology, is included with the course materials.

DESIGNED FOR

Development geoscientists and those exploring mature areas; early-career geoscientists and technologists who make structure maps; those who need to judge the validity of maps and cross sections.

YOU WILL LEARN HOW TO

- Recognize common contouring pitfalls
- Find thickness in deviated wells
- Use thickness maps to interpret structure
- Construct predictive cross sections
- Apply the best techniques for projecting data
- Make fault maps and integrate them with horizon maps
- Build a complete 3D interpretation
- Recognize valid and invalid fault surfaces
- Interpret folds and faults from dipmeters
- Construct juxtaposition (Allan) diagrams for fault trap and seal analysis
- Map structures with multiple overlapping faults

COURSE CONTENT

Manual and computer contouring techniques • Using dip in mapping • Different measures of thickness • Thickness in deviated wells • Thickness maps • Dip-domain cross sections • Data projection • Trend and plunge of folds on tangent diagrams • Composite-surface maps • Fault shapes and displacement distributions • Relationships between stratigraphic separation and heave and throw • Faults on isopach maps • Mapping across faults • Structural quality-control techniques • Multiple-surface map compatibility • Map validation using implied fault contours • Finding faults and fault orientations with SCAT analysis of dipmeters • Soft linked and hard linked faults • Relay and branching fault patterns • Mapping sequential cross-cutting faults

2016 Schedule and Tuition / 5 Days

HOUSTON, US	23-27 MAY	US$4065*

*plus computer charge

Geochemistry: Tools for Effective Exploration and Development – MGT

FOUNDATION

Undiscovered reserves in prolific, mature basins and bypassed petroleum in developed fields are key targets for increasing reserves at minimal cost. Geochemical tools can dramatically improve discovery and development success by identifying and characterizing these targets in both conventional and unconventional systems. Participants learn to interpret geochemical logs, map organic facies variations, identify petroleum systems using multivariate data, and predict vertical and lateral variations in oil quality and gas-to-oil ratios. This course teaches how to integrate geochemical, geological and engineering data to identify reservoir compartments, allocate commingled production, identify completion problems, and monitor flood progression. The course also explains how to optimize development by predicting vertical and lateral variations in API gravity and viscosity. Attendees learn interpretive guidelines to evaluate geochemical data.

DESIGNED FOR

Exploration and development geologists, geophysicists, geochemists, petroleum engineers, managers, and technical personnel. No background in geochemistry is needed.

YOU WILL LEARN HOW TO

- Characterize exploration risk in conventional and unconventional petroleum systems by assessing regional variations in organic facies, source maturity, source volumes, petroleum volumes generated, gas-to-oil ratios, and the risk of oil biodegradation.
- Integrate geochemical, geological and engineering data to identify reservoir compartments, allocate commingled production, identify completion problems, and monitor flood progression to optimize field development
- Recognize pitfalls in geochemical interpretations
- Use geochemical tools, including Total Organic Carbon (TOC), Rock-Eval pyrolysis, vitrinite reflectance, geochemical logs, gas chromatography, stable isotope ratios, biological markers (biomarkers), mud gas isotope data, and mud gas compositions
- Determine if hydrocarbon "stray gases" found in an aquifer are, or are not, related to petroleum drilling activities in a given area
- Design geochemical studies and collect samples

COURSE CONTENT

Assessing source rock quality, maturity, and petroleum-generating potential • Correlation: oil-to-oil, oil-to-source rock, gases-to-source rock • Applications of mud gas isotope data and mud gas compositions • Assessment of reservoir continuity, lateral and vertical changes in oil gravity and viscosity • Geochemical assessment of frac height • Geochemical allocation of commingled production • Worldwide exploration and production case studies • Determining the origin of hydrocarbon gases found in aquifers • Project planning using actual case studies

2016 Schedule and Tuition / 5 Days

HOUSTON, US	25-29 APR	US$4040
	5-9 DEC	US$4040

Geomechanics for Heavy Oil – HOGM

FOUNDATION

This course introduces an integrated workflow for reservoir containment evaluation and caprock integrity assessment in thermal operations such as SAGD and CSS in heavy oil reservoirs. The essential fundamentals of petroleum-related rock mechanics will be presented, and the processes of data collection, geomechanical characterization, and building Mechanical Earth Models (MEMs) will be discussed in detail with an emphasis on data uncertainty. This course presents the application of modeling in mitigating the adverse effects of risks and determining safe-operating criteria such as maximum operating pressure. Different aspects of field monitoring and real-time updating are discussed. Several case histories and in-class exercises help participants grasp a practical perception of the course materials.

COURSE CONTENT

Reservoir containment evaluation • Caprock integrity assessment • SAGD and CSS in heavy oil reservoirs • Fundamentals of petroleum-related rock mechanics • Processes of data collection • Geomechanical characterization • Mechanical Earth Models (MEMs)

See website for dates and locations.

Horizontal Well Placement in Heavy Oil Reservoirs – HOWP

FOUNDATION

Conventional hydrocarbon resources are becoming more and more elusive with each passing year. Many oil and gas companies are reverting to heavy oil or bitumen as 'Resource' plays to be exploited. Often, the technical challenge lies in how best to extract the reserves. Optimal placement of a horizontal or deviated wellbore can impact the economics significantly. This course uses real examples to demonstrate some of the challenges faced, and progressive group and team exercises to learn the skills needed to plan and coordinate the geological aspects of horizontal drilling.

COURSE CONTENT

Fundamentals of directional drilling with mud motors • Bent housing vs. rotary steerable systems • Measurement While Drilling tools • Surveys and ellipse of uncertainty • Logging While Drilling tools • Dogleg severity • Target planning and 'Geo-Steering' • Landing intermediate • Modifying horizontal targets • Class and team example • Post well review and perforation discussion

See website for dates and locations.

Production Geology for Other Disciplines – PGD

FOUNDATION

Have you ever wondered why it seems like Geologists rarely give you a straight answer? Do they appear to be constantly avoiding direct answers to apparently simple questions? Are there never-ending "qualifiers" tacked to the answers they provide? "Usually, for the most part, chances are, often, almost all the time, maybe, could be, should be, can be, it depends..." What do you do with the ranges of the interpretations offered? This course will clear these questions... you will understand what makes the Production Geosciences tick; you will be able to phrase the appropriate questions, and then you will be able to deal with the answers. This course assumes the participant has some understanding of elementary geology, but it will provide a review of key geological principles and environments of deposition, all keyed to focus on the practical impact of geological models and uncertainty on appraisal and development. Engineering, financial, and geological coordination and understanding are the objectives of this course.

DESIGNED FOR

Production/Completion/Reservoir Engineers, financial staff, professional staff from disciplines other than geology, and managers involved with reservoir management, and development/ production, who might require an understanding of geological data, its variability, and the effects of the data, and its interpretation, on their projects and jobs. This course is also appropriate for geologists early in their career development that are slated for production/ development positions.

YOU WILL LEARN HOW TO

- Understand the sources of geological data and the interpretation of that data, including maps, cross-sections, electric logs, and seismic sections
- Recognize the relationships between paleo-environmental interpretations and the practical application of these interpretations to field development
- Recognize and appreciate uncertainty in geological and geophysical data/interpretation
- Understand the uncertainty surrounding the geologist's interpretation.... "Why won't they give me a straight answer?"
- Recognize ways in which geological data is presented for evaluation in integrated asset teams
- Understand and more realistically evaluate geological data and interpretation
- Understand geological interpretation impact on production and development...pro and con

COURSE CONTENT

Correlation and stratigraphy • Structural interpretation • Seismology • Clastic/carbonate deposition including an introduction to Unconventional Reservoirs • Reservoir geology • Reservoir characterization and modeling • Volumetrics • Well planning • Reservoir appraisal • Field development • Uncertainty analysis

2016 Schedule and Tuition / 5 Days

HOUSTON, US	7-11 MAR	US$4040

Sequence Stratigraphy: An Applied Workshop – SQS

FOUNDATION **FIELD TRIP**

Sequence stratigraphy, based on sedimentary response to changes in relative sea level gives the explorationist and the development geoscientist a powerful new predictive tool for regional basin analysis, shelf to basin correlation, and reservoir heterogeneity. Perhaps most importantly, sequence stratigraphy gives the geoscientist a superior framework for the integration of geologic, geophysical, and engineering data and expertise. The particular strength of this seminar is the application of these basic principles to actual subsurface data sets gathered into a series of well-founded exercises. In recent courses the data sets included Miocene delta complexes in Venezuela, Cretaceous incised valleys in the US, Paleozoic mixed carbonate clastic basin floor fans and low stand prograding complexes in the US, and Jurassic basin floor and slope fans in France.

DESIGNED FOR

Geologists, geophysicists, biostratigraphers, and engineers (with some knowledge of geology) needing a fundamental understanding of the principles and applications of sequence stratigraphy.

YOU WILL LEARN HOW TO

- Identify unconformities and sequence boundaries
- Identify parasequences and utilize in correlation
- Identify incised valleys
- Visualize and interpret deep water fans and their geometries
- Recognize seismic signatures of deep water deposits
- Relate sequence stratigraphy to basin architecture and relative sea levels
- Build predictive stratigraphic models
- Utilize sequence stratigraphy to develop exploration/production strategies

COURSE CONTENT

Seismic geometries • Unconformities • Relative sea level • Eustasy • Parasequences and their stacking patterns • Parasequences as a correlation tool • Relationship of stratigraphic patterns to changes in subsidence rates as driven by regional and earth scale tectonic processes • Cycle hierarchy • World-wide cycle chart and its application • The sequence stratigraphic model • LST sequence boundaries, incised valleys, slope fans, basin floor fans, and prograding complexes • TST incised valley fill, source rock and reservoir seal • HST alluvial, deltaic, shoreline complexes and shelf sands • Sequence stratigraphy in a mixed clastic/carbonate province • Exploration and production scaled case histories and strategies

2016 Schedule and Tuition / 5 Days

DENVER, US †	1-5 AUG	US$4175
HOUSTON, US	24-28 OCT	US$4040
KUALA LUMPUR, MY	15-19 AUG	US$4835

† *includes field trip*

Structural Styles in Petroleum Exploration – ST

FOUNDATION

Even with the best of data, the correct interpretation of a subsurface structure usually requires recognition of the fundamental characteristics of the assemblage in which it occurs and the range of trap styles to be expected. This course provides an overview of all hydrocarbon-bearing structural assemblages and their associated trap types. The processes that produce the structures and control their styles are interpreted in terms of basic rock-mechanical principles. Classic outcrops, physical models, 2D and 3D seismic, and mature-field log-based interpretations from around the world provide analog examples for practical interpretation. Participants will learn the major structural trap geometries and the structural concepts for predicting the geometry where data are absent, misleading, or conflicting. The principles of section balancing and restoration are covered as tools for validating interpretations and for documenting structural evolution. Practical interpretation skills are developed in numerous exercises, most of which use seismic data.

DESIGNED FOR

Exploration geologists, geophysicists, engineers, and geoscience managers.

YOU WILL LEARN HOW TO

- Recognize all the different hydrocarbon-bearing structural styles in map and cross- section
- Distinguish the characteristics of each structural style on seismic reflection profiles
- Recognize the arrangement of structural styles and traps within structural families
- Apply mechanical-stratigraphic concepts to understand and predict trap geometry
- Use restoration and balance to validate an interpretation and show the structural evolution

COURSE CONTENT

Comparative structural geology • Structural families and styles • Mechanical principles governing fold and fault geometry • Predicting structure from stratigraphy • Folding vs. faulting • Palinspastic restoration of cross sections • Structural validation criteria • Sequential restoration and growth history • Regional arches and domes • Compaction and substratal solution • Wrench faults: simple, convergent, and divergent • Conjugate and domino-style strike-slip regimes • Thin-skinned fold-thrust belts • Fault-related folds • Duplexes • Basement-involved contraction • Vertical and rotational block uplifts • Inversion: dip-slip to strike-slip • Thin-skinned extension • Basement-involved extension • Half-graben and full graben rift systems • Domino-style extension • Diapirs • Salt sheets • Roho and counter-regional pseudoextensional fault systems • Plate-tectonic habitats of structural assemblages • Tectonic synthesis and exploration project

2016 Schedule and Tuition / 5 Days

HOUSTON, US	4-8 APR	US$4060

Analysis of Structural Traps in Extensional Settings – ESS

INTERMEDIATE **FIELD TRIP**

Extensional structures provide some of the world's largest known oil reservoirs and remain one of the major frontier plays of the immediate future, both onshore and, particularly, in deep water offshore. 3D seismic has revolutionized structural mapping. However, the most realistic geologic interpretation of these structures is only as good as our ability to recognize and exploit the fundamental characteristics of the forms that are possible. This course presents outcrop, subsurface, seismic sections, and model analogs that will provide the starting point for structural interpretation in a wide range of extensional environments. Interpretations are validated by restoration and comparison to balanced models. This course covers the latest restoration techniques and the use of predictive kinematic models appropriate for rifted and other extensional and transtensional areas. The instructors of this course are happy to accept examples from your company for analysis in the class as one of the demonstration exercises. Please contact PetroSkills for a list of the information and support data required, as well as the necessary lead-time.

DESIGNED FOR

Exploration and development geologists, geophysicists, engineers, and managers responsible for the interpretation and drilling of extensional structures.

YOU WILL LEARN HOW TO

- Distinguish the characteristics of extensional and transtensional deformation for both basement-involved and thin-skinned styles
- Apply mechanical-stratigraphic principles governing the formation and evolution of extensional structures and apply restoration and balancing techniques
- Predict structural geometry from sparse or inconsistent data using kinematic models
- Recognize typical extensional and transtensional petroleum-trapping geometries

COURSE CONTENT

Extensional structural styles and their plate tectonic habitats • Models for rifting and passive continental margin evolution • Transtensive structures • Detached and basement-involved styles • Map patterns • Half grabens and full grabens • Footwall uplift • Pre-inversion normal faults • Ramp-flat and listric-fault related structures • Rotated block with keystone graben style • Structural validation criteria • Selecting the best balancing and restoration technique • Flexural-slip restoration and predication • Vertical and oblique simple shear • Rigid-block restoration • Area-depth technique for section validation, depth to detachment, bed-length changes and fault prediction • Effect of detachment-zone thickness • Transition from horizontal to vertical displacement • Extensional drape folds • Trishear models of drape folds • Sequential restoration of growth structures • Fracturing in extensional structures

See website for dates and locations.

GEOLOGY

Basin Analysis Workshop: An Integrated Approach – BA

INTERMEDIATE

Basin analysis demands an integrated approach from explorationists. It can be both inappropriate and misleading to suggest that the tectonic-thermal-sedimentologic evolution of any one basin is an established fact, or even that all basins submit to the same simple and equivocal models. This five day course provides the theory, methods, and practice for participants to develop and optimize their own individual basin evaluation and modeling modus operandi. Incorporated as practical problems for workshop analysis and significant group discussion are case histories from throughout the world utilizing geologic, geophysical, and geochemical data. In addition, students construct and interpret their own geohistory subsidence curves using BASINMOD, the industries standard computer software for basin modeling. Each participant should bring a hand calculator to class.

DESIGNED FOR

Geoscientists who require a practical familiarity with the application of a variety of state-of-the-art conventional and unconventional tools of hydrocarbon evaluation to sedimentary basins.

YOU WILL LEARN HOW TO

- Systematically assess the evolution of a basin's petroleum system criticals through space and time through a non-linear parallel approach integrating geology, geophysics, and geochemistry
- Deconstruct a basin through space and time and build predictive basin models useful in exploration
- Evaluate the geomechanical fundamentals controlling a basin's burial history through tectonic subsidence analysis
- Determine the thermal history of a basin and its importance upon source maturity dynamics
- Relate organic source quantity and quality to sedimentary processes and environments
- Delineate migration pathways through space and time
- Characterize the essentials of reservoir and seal quality
- Construct and analyze Petroleum events chart
- Geovalidate the model
- Rank and quantify petroleum system risk deterministically and stochastically using Monte Carlo methods
- Construct and analyze a decision tree
- Classify basins for optimizing their exploration and development

COURSE CONTENT

Introduction to the Petroleum System and Petroleum System Criticals • Geomechanical fundamentals of basin formation • Burial history curve • Tectonic subsidence analysis • Geothermics: steady state and rifting • Organic geochemistry: quantity, quality, and maturity • Migration pathways • Reservoir-traps-seals and analogs • Critical points • Basin classification • Quantifying uncertainty, minimizing risk, and making decisions • Synthesis

2016 Schedule and Tuition / 5 Days

HOUSTON, US	18-22 APR	US$4140*
PARIS, FRANCE	21-25 NOV	US$4770*
SINGAPORE	8-12 AUG	US$4935*

*plus computer charge

Compressional and Transpressional Structural Styles – CPST

INTERMEDIATE

Compressional and transpressional structures provide some of the world's largest known hydrocarbon reservoirs and remain major frontier plays. 3D seismic has revolutionized structural mapping, but making the most realistic geologic interpretation of these structures requires an ability to recognize and exploit the fundamental forms. This course presents outcrop, subsurface, seismic sections, and model analogs that provide structural interpretation in a wide range of compressional and transpressional environments. Interpretations are validated by restoration and by comparison to balanced models. This course covers the latest restoration techniques and the use of the predictive kinematic models for thrust-fold belts.

DESIGNED FOR

Geologists, geophysicists, engineers, and managers responsible for the interpretation and drilling of compressive and transpressive structures.

YOU WILL LEARN HOW TO

- Distinguish the characteristics of compressional and transpressional deformation including distinguishing thin-skinned and basement-involved styles
- Identify the fundamental characteristics of the wrench assemblage
- Identify the characteristics of inversion structures
- Use the area-depth relationship to validate cross sections and predict sub-resolution structures
- Apply mechanical-stratigraphic principles to predict the formation and evolution of structures
- Apply restoration and balancing techniques
- Predict structural geometry from sparse or inconsistent data using kinematic models
- Recognize typical oil-field locations and geometries in compressional and transpressional structures

COURSE CONTENT

Compressional structural styles and their plate-tectonic habitats • Wrench assemblage • Transpressive structures • Detached (thin-skinned) styles including forearc, backarc, collisional, and deep-water thrust-fold belts • Basement-involved styles including compressional drape folds, predictive models for rotated blocks, and subthrust plays • Inversion • Structural validation criteria • Selecting the best balancing and restoration technique • Flexural-slip restoration • Area-depth technique for section validation, depth to detachment, bed-length changes, and fault prediction • Fault-bend folds • Fault-tip folds • Fault-propagation folds • Detachment folds • Buckle folds and the break-fold model • Duplexes • Triangle zones • Growth folds • Fracturing in compressional structures • Summary of oil and gas fields

2016 Schedule and Tuition / 5 Days

HOUSTON, US	1-5 AUG	US$4140

Deep-water Turbidite Depositional Systems and Reservoirs – DWT

INTERMEDIATE

This course provides a unique opportunity to examine modern, ancient, and subsurface examples of data from turbidite reservoirs. The process of iteration of data types, including analog data that was collected expressly to solve subsurface issues, will be offered to validate subsurface interpretations. The course combines review of state-of-the-art and historical theories for turbidite and debris-flow deposition and process – including many case studies of reservoir architecture and sand-body quality and distribution – with an introduction to new concepts, ideas, and methods in turbidite reservoir geology.

Special note: sessions in Nice and Kilkee will include field trips. The seven day sessions will be combined field and classroom based sessions. There will be four days in the classroom with lecture material and oilfield exercises on exploration and production, and three days in the field examining spectacular deepwater sections of either the Annot Sandstone Formation in Nice, Ross Sandstone Formation in Kilkee, or the Point Lobos Submarine Canyon and Pigeon Point Formation in Monterey, California. For Nice session, a moderate degree of physical fitness is required. For Kilkee, the going is easier in the field.

DESIGNED FOR

Exploration and production geologists and geophysicists, stratigraphers, reservoir engineers, and petrophysicists.

YOU WILL LEARN HOW TO

- Interpret turbidite depositional environments using data from cores, cuttings, and wireline logs
- Prepare predictive facies maps
- Apply modern stratigraphic concepts to turbidite reservoirs
- Predict reservoir size, shape, trend, and quality

COURSE CONTENT

Review of turbidite settings, processes, models • Turbidite systems at outcrop • Rock analogs for the subsurface (including injected sands) • Modern deepwater systems • Alternative reservoir geometrics • Seismic character of deepwater systems • Borehole/wireline characteristics • Significance and use of various tools • Correlation of reservoir units • Predictive models for sand distribution • Critical data input to reserve models • Definition of pay

2016 Schedule and Tuition / 5 Days

HOUSTON, US	10-14 OCT	US$4140

Development Geology – DG

INTERMEDIATE

Successful field appraisal, development, and management requires a fundamental understanding of the reservoir pore space distribution. Participants learn, through hands-on exercises, to compile a development plan that emphasizes optimal recovery. Emphasis is placed on rock, log and test data to distinguish reservoir and non-reservoir rock properties. Structural, stratigraphic, deposition and diagenetic concepts are used to locate drill sites and describe reservoirs. The input required to construct a geologic reservoir model is reviewed. Participants learn the importance of modifying development plans as a field becomes more mature. Techniques for mature field rejuvenation are discussed through case histories.

DESIGNED FOR

Reservoir, development, and exploration geologists; geophysicists; petrophysicists; log analysts; petroleum engineers; and experienced technicians.

YOU WILL LEARN HOW TO

- Select optimum drill sites for field development
- Use log and rock data to identify reservoir rock, non-reservoir rock, and pay
- Determine fluid distribution in a field and identify reservoir compartments
- Estimate field reserves through the life of a field
- Characterize carbonate and clastic rocks by productivity
- Construct geologic reservoir models
- Determine field drive mechanism
- Apply seismic analysis to reservoir development
- Determine depositional characteristics to optimize development
- Compile a development plan
- Use economic techniques to evaluate different development plans

COURSE CONTENT

Characteristics that impact field development • Determining recoverable hydrocarbons • Reservoir fluid properties • Influence of capillarity reservoirs • Volumetric reserve estimation and calculation • Stratigraphic influence on production • Controls on reservoir rock, barriers, and hydrocarbon distribution• Describing reservoir rock in carbonate and clastic rocks • Determining recoverable hydrocarbons • The impact of drive mechanism • Seismic applications • Development drilling: optimizing hydrocarbon recovery • Economic impact on field development • Subdividing the reservoir into working units • Reservoir pore space configurations • Building a static reservoir model using deterministic and stochastic techniques • Key factors affecting the development of fractured reservoirs • Impact on barriers on field development • Secondary and tertiary field development • Rejuvenating old marginal fields

2016 Schedule and Tuition / 5 Days

HOUSTON, US	16-20 MAY	US$4140
	7-11 NOV	US$4140
KUALA LUMPUR, MY	25-29 JUL	US$4935
LONDON, UK	15-19 AUG	US$4770+VAT

Geochemical Techniques for Solving Reservoir Management and Field Development Problems – GTS

INTERMEDIATE

During field development and production, numerous problems can be solved through integration of geochemical, geological, and engineering data. Geochemical approaches for solving these problems are appealing for several reasons. 1) They provide an independent line of evidence that can help resolve ambiguous geological or engineering data. Example: geochemical data can reveal whether small differences in reservoir pressure reflect the presence of a barrier between the sampling points. 2) They are far less expensive than engineering alternatives. Example: geochemical allocation of commingled production costs only 1-5% as much as production logging. 3) They have applicability where other approaches do not. This course explains how geochemistry complements other reservoir management tools. Case studies and exercises illustrate key points. Computer-based exercises illustrate the utility of certain key software packages. Sampling pitfalls and sources of contamination are discussed. The course will NOT cover PVT (Pressure-Volume-Temperature) relationships or equation of state calculation.

DESIGNED FOR

Development geologists, petroleum engineers, managers, and technical personnel.

YOU WILL LEARN HOW TO

- Use mud gas isotopes to identify and characterize pay zones
- Use the geochemistry of produced fluids (oil, gas, water) and/or core material to: identify missed pay, assess reservoir compartmentalization, allocate commingled production, identify completion problems (tubing leaks, poor cement jobs, etc.), characterize induced fractures (e.g., fracture height), monitor the progression of floods (water, gas, or steam), predict vertical and lateral variations in fluid viscosity and gravity, and identify the geological processes which control fluid properties in a given field.
- Use certain key software packages (including, PeakView, ReserView, OilUnmixer, Excess Pressure calculations, etc.)

COURSE CONTENT

Using fluid compositions as "natural tracers" for tracking fluid movement and compartmentalization • Understanding processes that cause compositional differences between fluids (e.g., differences in source facies, source maturity, biodegradation, water washing, evaporative fractionation, etc.) • Integrating geochemical, geological, and engineering data to identify missed pay, characterize reservoir compartmentalization, allocate commingled production, identify well completion problems, predict fluid viscosity/gravity, and monitor floods • Basics of oil, water, gas, and mud gas compositional analyses

See website for dates and locations.

Integrated Carbonate Reservoir Characterization – ICR

INTERMEDIATE

This course will review the controls on carbonate reservoir heterogeneity from the pore architecture scale to the geometrical attributes at reservoir-scale and how these parameters can be incorporated and integrated into the development of viable petrophysically-based reservoir models for carbonates. In-class exercises are used to reinforce the potential integration of various data sets to provide students with experience in carbonate reservoir characterization.

DESIGNED FOR

Exploration and development geoscientists, petrophysicists, reservoir engineers, geostatistical modelers and research/development staff.

YOU WILL LEARN HOW TO

- Integrate various aspects of carbonate rocks for improved carbonate reservoir architecture and flow unit characterization
- Apply knowledge of petrophysical, sedimentological petrologic tools to characterize and evaluate carbonate reservoirs
- Recognize and better understand well log responses in carbonate systems and to learn to utilize data from formation evaluation tools to determine reservoir quality
- Identify potential stratigraphic variations in carbonate pore architecture and its effect on permeability
- Better understand the relationship of primary depositional facies, sequence stratigraphic framework, and diagenetic history to pore architecture and reservoir quality
- Better understand fracturing in carbonates, relating fracture density, aperture, length to facies, lithology, and diagenesis
- Distinguish controls on carbonate reservoir heterogeneity, sub-reservoir to reservoir scale
- Better understand carbonate reservoir heterogeneity and the value of 3D geostatistical model building to better manage the development of carbonate reservoirs

COURSE CONTENT

Importance of understanding the various scales of heterogeneity in carbonate reservoirs • Carbonate deposition, diagenesis, mineralogy, rock textures, and pore types • Carbonate rock and carbonate pore system classification • Carbonate rock properties and core analysis • Well log response, limitations, and strengths in carbonates • Determination of lithology, porosity, and permeability • Fracture identification and distribution • Porosity/depth relationships in limestone and dolomite reservoirs • Importance of sequence boundaries to development of pore architecture • Variations in carbonate pore architecture and its effect on permeability • Relationship of primary depositional facies, sequence stratigraphic framework and diagenetic history to pore architecture and reservoir quality • Controls on reservoir heterogeneity, from sub-reservoir to reservoir scale • Value of analogs for development of petrophysically-based reservoir models • Value and limitations of 3D geostatistical models to understand reservoir heterogeneity and architecture

2016 Schedule and Tuition / 5 Days

HOUSTON, US	13-17 JUN	US$4190
LONDON, UK	14-18 NOV	US$4820+VAT

Operations Geology – OG

INTERMEDIATE

As geoscientists, petroleum engineers, well engineers, and production technologists are increasingly assembled in asset, project, or operational teams they must not only understand each other in technical matters, but should also contribute to each other's efforts in these aspects: a driller should know why it is important to cut a core or log a particular interval despite potential drilling problems, and geoscientists should understand drilling operations and their inherent hazards and problems. All should be able to understand and prepare daily drilling reports with a full appreciation of the various subjects. Cuttings, cores, logs, and well tests should be analyzed, cross-correlated, and compiled to mesh with prognoses and existing data to effectively manage the impact on the field development plan. Correct procedures in tendering and contracting should be followed to minimize the duration of the operations and to maximize the quality of the operations services provided. Note: A basic knowledge of geology and/or petroleum geology is advisable if not required to fully appreciate the course contents.

DESIGNED FOR

All geoscientists, petroleum engineers, well engineers, and technical personnel, who in the course of their career will attend or direct subsurface and wellsite operations.

YOU WILL LEARN HOW TO

- Plan and prepare for a drilling location and for geological services
- Identify drilling operations and geological drilling hazards
- Understand and apply logging services
- Understand well testing services
- Evaluate drilling reports
- Describe drilling cuttings and cores
- Evaluate the impact on the field development plan
- Prepare and compile operations reports

COURSE CONTENT

Petroleum geology and its systems • Operations geology: prospect to well planning, provision of geological services • Wellsite geology: geological sampling, sample analysis, and well stratigraphy, cutting, and core description • Structural geology: fractures, faults, borehole geology • Drilling Operations: bits, fluids, casing and cement, drilling problems and well control, directional drilling, geosteering • Logging operations: acquisition, tools, quick look interpretation, MWD/LWD, geosteering • Well testing and fluids: reservoir properties, rock and fluid interaction, permeability, averaging, data gathering and interpretation • Impact on FDP: case histories • Tendering and contracting • Reporting: geological data, petrophysical data, pressure data • Exercises: cores, cuttings, quick look, pressures, daily drilling report

2016 Schedule and Tuition / 5 Days

HOUSTON, US	22-26 AUG	US$4140

Prospect and Play Assessment – PPA

INTERMEDIATE

This fully revised and updated course is a fully modern approach to defining prospect and play volumetrics, uncertainties in defining these volumes and the risk that the accumulation exists. This course offers the industry quantitative, probabilistic play and prospect assessment procedures that are consistent and repeatable allowing for direct comparisons play to play or prospect to prospect. In addition, the methods offer measures of the play prospectiveness based on the number and resource size distribution of potential future fields. Tools include comprehensive assessment forms for prospects and plays, and graphs, data tables, and guidelines for making all assessment decisions.

DESIGNED FOR

All exploration team members and leaders including geologists, geophysicists, geochemists, analysts, reservoir engineers, economists, planners and managers who make business decisions based upon exploration data.

YOU WILL LEARN HOW TO

- Calculate geological risk and uncertainty in exploration prospects
- Determine prospect resource volume estimates
- Assess resource distribution in a play
- Understand the differences between stochastic and probabilistic estimates and have the knowledge to know when to one or the other.
- Predict the number and size distribution of potential future fields in a play
- Describe and calibrate risks associated with discovering a successful play

COURSE CONTENT

Geological controls of oil and gas occurrence • Review of common assessment methods • Application of volumetric prospect assessments: techniques, comparative data, and graphs to estimate input factors, such as trap volume, porosity, net/gross saturation, hydrocarbon fill fraction, formation volume factors, and recovery efficiencies • Probability methods • Risk analysis • Hydrocarbon charge assessment: procedures for estimating possible amounts of oil and gas generated, migrated, and trapped in prospects • Prospect assessment workshop • Play assessment techniques: estimating the possible numbers, sizes, and associated risks for potential fields, with useful data on field densities, field-size distributions, oil versus gas relationships, and dependent versus independent risks • Play recognition and mapping: play classification and subdivision, and play maps that high-grade the most favorable areas with minimal geologic risks • Play assessment workshop: projects supplied either by the instructor or by participants, worked by teams and reported to the entire group • Aggregation of assessment results: summing, derisking, and preparation for economic analysis • Limitations, pitfalls, uses, and discovery concepts: the philosophy of judging and using assessment results and the importance of basic geologic concepts

2016 Schedule and Tuition / 5 Days

HOUSTON, US	18-22 APR	US$4140
LONDON, UK	13-17 JUN	US$4770+VAT

Naturally Fractured Reservoirs: Geologic and Engineering Analysis – FR

SPECIALIZED **FIELD TRIP**

This course covers geologic and engineering concepts, methodology, and technology used to characterize, evaluate, and manage naturally-fractured reservoirs. Applications and limitations of geologic and engineering procedures and tools are discussed. Field examples and case studies demonstrate the importance of integrated geologic and engineering studies in developing effective, economical reservoir management strategies for different types of reservoirs.

DESIGNED FOR

Engineers and geoscientists interested in a multi-disciplinary approach to evaluating and predicting the overall effect of natural fractures on subsurface fluid-flow and subsequent reservoir performance.

YOU WILL LEARN HOW TO

- Detect and predict subsurface natural fracture occurrence and intensity from cores and well logs
- Determine fractured rock properties affecting reservoir performance
- Design and analyze pressure transient tests in naturally-fractured reservoirs
- Evaluate reservoir performance in naturally-fractured reservoirs
- Develop and apply numerical simulation models to fluid-flow in naturally-fractured reservoirs
- Apply coupled geomechanics/fluid-flow behavior to reservoir management strategies in naturally fractured reservoirs
- Evaluate the impact of natural fractures on hydraulic fracture stimulation

COURSE CONTENT

Characterization of natural fractures and fracture systems • Influence of mechanical stratigraphy and structure on fracture development • Detection and prediction of subsurface natural-fracture occurrence and intensity from cores and well logs • Fractured rock properties affecting reservoir performance • Classification of naturally-fractured reservoirs with reservoir examples and potential production problems • Naturally-fractured reservoirs: fluid-flow, well performance and well testing, reservoir performance, numerical simulation • Geomechanics/fluid-flow • Behavior and stimulation of naturally-fractured reservoirs • Effects of natural fractures on reservoir permeability, anisotropy, drainage area, and waterflood sweep efficiency

2016 Schedule and Tuition / 5 Days

ALBUQUERQUE, US †	25-29 APR	US$4400
DENVER, US	18-22 JUL	US$4250
HOUSTON, US	14-18 NOV	US$4240
LONDON, UK	12-16 SEP	US$4870+VAT

† includes field trip

ArcGIS Essentials for Petroleum – GISE

FOUNDATION

This is an entry-level course that teaches you how to use Esri's ArcGIS Desktop within oil and gas exploration and production activities, using petroleum industry spatial data and workflows. This course allows you to explore the benefits in applying Geographic Information Systems (GIS) to your petroleum workflows. You will be introduced to fundamental ArcView functionality that allows geoscientists to import spatial and non-spatial databases, and integrate, manage, and analyze data to produce information for decision making. No geospatial knowledge is assumed beyond that acquired through the use of geological maps. Although petroleum exploration and production (E&P) sector knowledge is not required, this course is geared towards assisting participants to implement E&P workflows geospatially.

DESIGNED FOR

Geoscience professionals and support staff who are going to be using GIS tools, and E&P project staff who need a basic understanding of GIS in order to manage geospatial projects.

YOU WILL LEARN HOW TO

- Explore the benefits in applying Geographic Information Systems (GIS) to your petroleum workflows
- Utilize ArcGIS functionality to import spatial and non-spatial databases, and integrate, manage, and analyze data to produce information for decision making
- Use industry standard ArcGIS tools, including ArcMap, ArcCatalog, and ArcToolbox
- Focus on learning how to put E&P workflows through ArcGIS
- Set up an E&P project
- Join spatial data to a well database
- Create a well layer from tabular X and Y coordinates
- Digitize a fault map and edit a play fairway map
- Undertake spatial and attribute queries
- Export data into a number of formats
- Produce professional map layouts
- Update a play fairway and assess potential acreage

COURSE CONTENT

Setting up an E&P project • Managing E&P data layers • Georeferencing images • Joining spatial data to tabular well data • Linking spatial data to a well database • Creating simple hyperlinks • Building hyperlinks into an attribute table • Digitizing a fault map • Editing a simple play fairway • Spatial data queries • Attribute query with SQL • Simple spatial data analysis • Exporting attribute tables • Producing map layouts • Exporting map images • Updating the play fairway • Assessing potential acreage

2016 Schedule and Tuition / 2 Days

HOUSTON, US	11-12 APR	US$1660*

**plus computer charge*

ArcGIS Coordinate Reference Systems for Petroleum – GISC

FOUNDATION

With a view to encouraging good practice within the oil and gas exploration and production (E&P) sector, the emphasis in this course is on developing the ArcGIS Desktop skills you need to successfully manage coordinate reference systems (CRS) issues within ArcView. All spatial data is concerned with location on the surface of the earth and this "position" is governed by the parameters of the CRS employed. If you do not manage coordinate reference systems correctly, your data could be incorrectly located with the potential for costly disasters and mistakes, such as drilling in the wrong location, damage to existing infrastructure, incorrect positioning of geohazards, interpretation and modeling in wrong location, and incorrect reserves calculation.

DESIGNED FOR

Data management, IT, geoscience, and other professionals and support staff who are going to be building and managing spatial data for specific projects, assets, or company-wide data stores and need to be able to acquire the relevant ArcGIS skills and knowledge.

YOU WILL LEARN HOW TO

- Explore the benefits in applying Geographic Information Systems (GIS) to your petroleum workflows
- Utilize ArcGIS functionality to import spatial and non-spatial databases; integrate, manage, and analyze data to produce information for decision making
- Use industry standard ArcGIS tools, including ArcMap, ArcCatalog, and ArcToolbox
- Develop the ArcGIS skills required to manage coordinate reference systems
- Better understand petroleum CRS sector standards
- Understand the workflows required to undertake datum transformations
- Work through common problems encountered in oil and gas and develop a strategy for dealing with these issues

COURSE CONTENT

Properties of coordinate reference • Systems map projections and the ArcMap Data Frame • Exporting and projecting vector data • Raster datasets and coordinate reference systems • Datum transformations • The EPSG Geodetic Parameter Dataset

2016 Schedule and Tuition / 1 Days

HOUSTON, US	13 APR	US$830*

**plus computer charge*

Presented in partnership with exprodat GIS for Petroleum

These two courses are offered separately or together as a one-week Data Management Pathway. Completing the Data Management Pathway provides the skills and knowledge required to effectively manage and extract full value from geographical data.

Basic Petroleum Technology – BPT

BASIC

This course presents a non-technical, practical understanding of petroleum industry technology in an interesting and effective manner. Industry technology basics and terminology are learned by progressing through the E&P asset management cycle from exploration to abandonment. Participants are placed in the position of Reservoir Engineer, and "Our Reservoir" is defined, analyzed and put in production. Participants are then placed in the position of Drilling/Completion Engineer, and the drilling/completion program for "Our Well" is analyzed. Participation results in greater job confidence, enthusiasm and productivity. Basic Petroleum Technology is ideal for staff who need to be able to understand the various aspects of oil and gas operations and speak the language of the oilfield. The first day will give an introduction to the industry and cover reservoir fluids. The next two days will include petroleum geology and reservoirs, and introduce exploration technology. The fourth day will cover drilling engineering, operations, and well completion technology. The course will wrap up with production technology, reservoir development, and surface processing.

DESIGNED FOR

Administrative, support personnel, management, field support, accounting, purchasing, economics, legal, finance, human resources, drafting, land and data processing personnel, as well as investors and royalty owners. Participants involved at the technical level of the industry, particularly engineers, should register for the Basic Petroleum Engineering Practices course.

YOU WILL LEARN

- Terminology of exploration and production (language of the oil field)
- Basic geology as related to oil and gas reservoirs
- Reservoir fluid and rock properties
- Basics of seismic technology
- Reservoir definition and development; production and recovery
- Unconventional reservoirs
- Fundamentals of drilling, well completions and production operations
- Basic concepts of primary and enhanced recovery operations
- Surface operations

COURSE CONTENT

E&P asset management process overview • Reservoir fluid properties • Petroleum geology • The petroleum reservoir • Unconventional reservoirs • Exploration technologies • Drilling technology • Well completions and workovers • Production operations • Reservoir recovery mechanisms • Surface processing

2016 Schedule and Tuition / 5 Days

ABERDEEN, UK	14-18 MAR	US$4570+VAT
HOUSTON, US	8-12 FEB	US$3940
	11-15 JUL	US$3940
	17-21 OCT	US$3940
KUALA LUMPUR, MY	7-11 NOV	US$4735
LONDON, UK	16-20 MAY	US$4570+VAT
	8-12 AUG	US$4570+VAT

Exploration and Production Process Basics: Understanding the Petroleum Industry Value Cycle – EPB

BASIC

This workshop describes the petroleum value chain from prospect identification, to project commissioning, to final abandonment. Participants will leave this course with a firm understanding of the petroleum industry, including the knowledge and tools necessary to understand the relationships and dependencies across the E&P industry. The course offers a fresh look at a range of critical, inter-related topics and will be taught with the modern learner in mind. Multiple tools, such as peer-based learning, internet resources, hands-on exercises, in-depth team workshops, and group discovery sessions, will be used to ensure learning retention and recall. Participants work as members of multi-disciplinary teams using real oilfield data in interactive workshops that illustrate technology/business concepts. Each team will be accountable for the results of their interpretations in a safe, constructive learning environment. Other skills will be learned in short hands-on exercises that reinforce the lectures. Lecturers are widely experienced oil field professionals who can share experiences from a number of technical settings and organizational approaches to give the students a broad view of the industry and its participants. The extended workshops conducted during the course include an exploration/discovery workshop, an appraisal workshop to define the static and dynamic models for a new discovery, and a facilities workshop in which the students fit the facilities to their newly-defined discovery. Uncertainties, risk management, business practices, and project management lessons are learned through these team events.

DESIGNED FOR

Newly-hired engineers and geoscientists.

YOU WILL LEARN

- Exploration/production overview
- Basic petroleum geology and geophysics principles
- Log interpretation basics
- Drilling basics
- Basic reservoir, production, and facilities engineering
- Business principles governing E/P

COURSE CONTENT

Opportunity identification • Elements of petroleum environment • Play to prospect to field technologies • Concessions and contracts • Find and define an asset • Appraise an opportunity • Build a field development plan • Facilities: gas, oil, design, construction, processing, maintenance, decommissioning • Building an effective team • Company/industry processes and procedures

2016 Schedule and Tuition / 10 Days

HOUSTON, US	16-21 MAY	US$6890*

*plus computer charge

Evaluating and Developing Shale Resources – SRE

FOUNDATION

This course will cover current practices for evaluating, drilling, and completing these challenging reservoirs. Discussions and exercises will include a focus on the limitations of many of the current tools and technologies. Information and opportunities for many current and international shale plays will be described. The participant should leave the course with a foundational understanding of value-adding shale gas resource practices and an insight into determining the critical reservoir and stimulation parameters used to predict a potential commercial resource play.

DESIGNED FOR

Reservoir, production and completion engineers, petrophysicists, geologists, geophysicists and other professionals who desire a thorough overview of shale resource development.

YOU WILL LEARN HOW TO

- Describe the resource potential and economic importance of shale gas and shale oil
- Describe the similarities/differences between shale gas, tight gas and coalbed methane
- Describe shale play differences and critical reservoir properties to identify "sweet spots"
- Estimate gas and oil in place
- Apply different resource evaluation techniques recognizing the advantages and disadvantages of each technique
- Apply drilling, completion, and stimulation technology to shale gas and shale oil
- Evaluate and forecast individual well and reservoir performance
- Determine how to estimate well reserves in both PDP (proved developed producing) and PUD (proved undeveloped) categories.

COURSE CONTENT

Current shale plays and their global impact • Organic quality, rock quality and mechanical quality properties; geological setting; rock properties; petrophysical considerations; the role of seismic data in field evaluation • Drilling: vertical vs. horizontal wells; pilot holes; fluids; MWD and LWD; wellbore sizes and lateral; drilling challenges; mechanical considerations • Completions: cased vs. open hole; perforation schemes; stimulation design and considerations; case histories • Field trials and pilots: pilot program to optimize well drilling, completion, understanding Stimulated Rock Volume (SRV) using microseismic, fiber optics, production logs, and other resources • Production forecasting and reserve calculations: volumetrics; performance analysis; simulation; resource development; decline curve analysis; handling uncertainty in estimates • Logistics, pad design, field development, water resources, and the social license

2016 Schedule and Tuition / 5 Days

DENVER, US	7-11 NOV	US$4050*
HOUSTON, US	11-15 APR	US$4040*
	12-16 SEP	US$4040*
SAN ANTONIO, US	5-9 DEC	US$4000*

*plus computer charge

Basic Geophysics – BGP

BASIC

This course is designed to familiarize anyone using seismic data with the nature of the data and what it specifically represents. One of the key goals of the course is to explain the large and confusing amount of jargon that is used by the geophysical community when they use seismic data. The course is supplemented by a large number of case histories that concretely illustrate the principles in the course material. These are updated with every course presentation to keep up with the rapidly developing technology in this field. Each section of the course is supported with a classroom exercise. The course participants are given a data-thumb drive that contains the case histories, class exercises, and all of the extensive PowerPoint animations used in the classroom.

DESIGNED FOR

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data as a communication vehicle.

YOU WILL LEARN

- How seismic data represent subsurface rock parameters including the relative structure, lithology, and pore filling material
- How land and marine seismic data are acquired and processed to produce both a two- and three-dimensional seismic image
- The limits of vertical and horizontal resolution inherent in the seismic data
- How seismic data are used to measure reservoir parameters and how data relate to reservoir development; this includes a detailed discussion of AVO and other seismic attributes
- The various approaches to seismic imaging and how the velocity model relates to this image
- How new technologies including seismic inversion have helped us to define rock properties including pore filling material, pore pressure, water saturation, and fracture orientation
- How to value developments such as time lapse seismic surveys for reservoir monitoring purposes

COURSE CONTENT

- The nature of seismic data
- What is wave propagation?
- What causes seismic reflections and how they relate to rock properties including pore filling material
- The wavelet in the seismic data and its limit of resolution
- Seismic velocities as they relate to rock properties and the imaging process
- The relationship between seismic velocities and pore pressure
- Pore pressure prediction
- Seismic data processing and seismic migration
- Prestack, poststack, time and depth imaging
- Direct hydrocarbon indicators and AVO
- Seismic inversion for rock and fluid properties
- Seismic attributes
- Time lapse reservoir monitoring (4D seismic surveys)
- Recent developments in seismic acquisition, processing, and interpretation

2016 Schedule and Tuition / 5 Days

BAKERSFIELD, US	24-28 OCT	US$3900
COVINGTON, US	11-15 JUL	US$3900
DENVER, US	14-18 MAR	US$3950
HOUSTON, US	2-6 MAY	US$3940
	15-19 AUG	US$3940
	3-7 OCT	US$3940

Seismic Interpretation – SI1

FOUNDATION

Can I observe the reservoir on seismic? How large is the reservoir? Did the well cut a fault? Can seismic help me tie a set of wells? What kind of a structural trap did I drill into? Is the structure valid or a seismic artifact? Are these reflections real or multiples? How can I combine structural and stratigraphic interpretations to develop a structural and depositional history? How does seismic data acquisition and processing impact my interpretation? Will my well encounter hazards such as abnormal pressure or shallow gas? The participant learns to answer these and related questions by gaining an understanding of the seismic system, its limitations and pitfalls, and by interpreting 2D and 3D seismic examples of structural and stratigraphic features associated with actively producing hydrocarbon areas.

DESIGNED FOR

Geologists, geophysicists, and engineers who want to use seismic data for petroleum exploration and/or production. Familiarity with geological terminology will be helpful.

YOU WILL LEARN HOW TO

- Understand the seismic process, interpret seismic sections, develop a geologic model, and prepare maps
- Relate the subsurface stratigraphy to well data
- Identify different structural styles from seismic data
- Create a basic stratigraphic framework using seismic stratigraphy

COURSE CONTENT

- Basics: geological controls on the propagation, reflection, and refraction of seismic waves
- Data acquisition and processing with emphasis on its potential impact on interpretation
- 2D and 3D interpretation techniques
- Seismic interpretation of different structural styles: extensional, compressional, strike-slip, inverted, salt, and gravity dominated basins
- Seismic velocities
- Sequence stratigraphy and seismic facies analysis
- Acoustic impedance
- DHIS
- AVO

2016 Schedule and Tuition / 5 Days

HOUSTON, US	22-26 FEB	US$4040
	24-28 OCT	US$4040
LONDON, UK	6-10 JUN	US$4670+VAT

AVO, Inversion, and Attributes: Principles and Applications – AVO

INTERMEDIATE

The subject of direct hydrocarbon indicators and AVO has rapidly expanded to include AVO inversion, offset AVO inversion, and 4D AVO inversion. A significant part of the course deals with rock physics as it relates to the other topics in the course. Further insight into the seismic data is supplied by looking at seismic attributes. The technology has provided the interpreter with a very new and exciting package of tools that allow us to look at the seismic image as being truly representative of both the rock properties and the pore filling material. This course is intended to provide the users and applicationists with a clear and useable understanding of the current state of these technologies. The focus of the course is on both understanding and application. Exercises: Each topic in the course outline is reinforced by an exercise that gives the participants many practical and simple methods of integrating the course material into their everyday work.

DESIGNED FOR

Geophysicists, geologists, explorationists, seismic interpreters, technical support personnel, seismic data processors, exploration, production, and acquisition managers who need a clear understanding of the details of implementation and application of this technology.

YOU WILL LEARN HOW TO

- Clearly understand how hydrocarbons affect the seismic image
- Use direct hydrocarbon indicators and AVO in the assessment of projects
- Understand the limits of seismic resolution
- Integrate these technologies into an interpretation project
- Better understand the nature of the seismic image as it relates to hydrocarbons
- Utilize the information available in the literature from experts in this rapidly developing part of seismic imaging

COURSE CONTENT

Seismic fundamentals as they relate to defining the appearance of hydrocarbons in the data • An inventory of direct hydrocarbon indicators, including AVO • Risk rating prospects that display AVO anomalies • Understanding rock properties and the effect of pore filling material • AVO and how it relates to the typical production zones around the world with various ages and depths of burial • Various methods of displaying AVO effects in the seismic data • Acquisition and processing considerations to display hydrocarbons as a pore filling material • Various approaches to seismic modeling and fluid replacement • Rock properties and pore filling material from seismic inversion • Spectral decomposition and seismic attributes as other ways of extracting reservoir information from the seismic image • Methods of combining attributes as they relate to prospectivity

2016 Schedule and Tuition / 5 Days

HOUSTON, US	22-26 AUG	US$4140*

plus computer charge

Introduction to Seismic Stratigraphy: A Basin Scale Regional Exploration Workshop – ISS

INTERMEDIATE

One of the most revolutionary, most effective, yet most under-utilized tools introduced into exploration this century is that of seismic stratigraphy. It is not a tool exclusive to geophysicists, nor is it a tool only for geologists. Seismic stratigraphic techniques are based upon an integration of firm, well-established geological and geophysical fundamentals. When properly applied, seismic stratigraphy provides a powerful foundation for geohistory analysis, helping describe a basin's evolution and the resulting effects upon its spatial and temporal variation in hydrocarbon potential. Seismic stratigraphy chronostratigraphically constrains both the sedimentological and fault-mechanical stratigraphy of a basin. Furthermore, it can provide a predictive model extrapolated beyond the borehole as to aspects of the quality of potential reservoirs and seals, their sedimentary environments of deposition, and in some cases, even their paragenesis. In this rigorous workshop, pragmatically the seismic stratigraphic method to optimizing their exploration efforts by working in teams on projects selected from diverse settings around the world. Areas for the projects include borehole-constrained seismic data drawn from such regions as the Alaska North Slope, Gulf of Mexico, Red Sea, Southeast Asia, South America, and Western Africa.

DESIGNED FOR

Geophysicists, geologists, explorationists, and managers who are interested in an introduction or review of the theory and application of contemporary seismic stratigraphic techniques to exploration.

YOU WILL LEARN HOW TO

- Apply geophysical fundamentals to uncovering the geological information embedded within seismic
- Understand the premises behind the Vail seismic sequence paradigm
- Construct and interpret chronostratigraphic charts, sea level curves, and seismic facies maps
- Interpret clastic and carbonate depositional system responses to allocyclic and autocyclic processes and the effects upon reservoir architecture and seal potential
- Systematically reconstruct a basin's geohistory which provides the critical foundation for its petroleum system analysis and effective exploration

COURSE CONTENT

Introduction: philosophy and history • Geophysical fundamentals • Breaking out operational sequences • Introduction to fault interpretation • Chronostratigraphy construction and interpretation • Sea level curves, accommodation space, and cycle orders • Vail sequence theory and sequence hierarchy • Carbonate sequences • Siliciclastic sequences • Seismic facies • Paleo-environmental analysis • Geohistory reconstruction • Optimizing exploration

2016 Schedule and Tuition / 5 Days

MIAMI, US	15-19 FEB	US$4150

Advanced Seismic Stratigraphy: A Sequence – Wavelet Analysis Exploration – Exploitation Workshop – ADS

SPECIALIZED

The methods used in this workshop do not rely upon either cosmetic processing or interpretation as an art; instead, practical methods of seismic stratigraphy are employed as a science, based upon firm, tested principles that are applied to a spectrum of tectonic structural styles and depositional environments. Participants learn how to make seismic modeling-interpretation judgments as a basis for seismic-facies and reflection character analysis. Case studies for exploration and development incorporate 2D and 3D seismic data with well data selected from around the world. Each participant should bring a hand-held calculator to class.

DESIGNED FOR

Geophysicists, geologists, and explorationists who have completed the PetroSkills course, Introduction to Seismic Stratigraphy: An Exploration Workshop: A Basin Scale Regional Workshop, or have comparable training and desire a challenging workshop, which will improve exploration and development skills

YOU WILL LEARN HOW TO

- Evaluate rock-fluid information from wavelet analysis (frequency, velocity, Q. seismic attributes, and AVO)
- Understand the strengths and weaknesses of geovalidation using and misusing synthetics, seismic inversion, and VSP
- Determine fault mechanical stratigraphy through proper interpretation of fault imaging
- Understand the differences, weaknesses, and strengths of both the Vail with the Galloway sequence paradigms
- Develop sea level curves from micropaleontology
- Construct detailed seismic facies maps and understand their relationship to Walter's law
- Classify deltas based upon their seismic characteristics
- Differentiate basin floor fan facies and parasequence sets
- Interpret clastic and carbonate depositional system responses to allocyclic and autocyclic processes and the effects upon reservoir architecture and seal potential
- Optimally interpret parasequence set fairways for exploration
- Geophysically characterize reservoirs for optimizing development

COURSE CONTENT

Review of philosophy and epistemology • Application of geophysical fundamentals (wave theory, attributes, frequency substitution, and coherency) • Amplitude variation with offset (lithologies, fluids, gases, porosities, and pressures) • Fault mechanical stratigraphy • Vail and Galloway sequence theory and application • High resolution sea level curve generation from micropaleo • Shallow and deep water siliciclastic sequences • Seismic facies and paleo-environmental analysis • Reservoir scale geophysics using the wavelet • Imaging hydrocarbons • Geohistory reconstruction • Optimizing exploration and development

2016 Schedule and Tuition / 5 Days

HOUSTON, US	7-11 NOV	US$4340
MIAMI, US	22-26 FEB	US$4300

Foundations of Petrophysics – FPP

FOUNDATION

Petrophysics is fundamental to all aspects of the petroleum business. Principles, applications, and integration of petrophysical information for reservoir description will be discussed in depth. Through a combination of class discussion and exercises/workshops, participants will learn how to conduct competent quick-look evaluations. Using data from open hole logs, logging-while-drilling, and core data you will evaluate porosity, permeability, and saturation in a variety of reservoirs. Knowing how to integrate petrophysical information with other data sources will improve participants' ability to assess technical risk when examining hydrocarbon opportunities.

DESIGNED FOR

Geoscientists and engineers with less than twelve months experience using petrophysical data and other technical staff at all experience levels wanting a fundamental background in the petrophysics discipline.

YOU WILL LEARN HOW TO

- Understand and apply at a basic level the theory and operation of major petrophysical tools
- Calibrate porosity and permeability values from core and log sources for improved saturation calculations
- Apply basic open hole logging, borehole seismic, image, and LWD/MWD
- Analyze and integrate log, core, geoscience, and engineering well data for well and field development projects
- Select petrophysical tool combinations for specific applications
- Assess the impact of petrophysical analyses on technical uncertainty estimates of reservoirs

COURSE CONTENT

- Fundamental concepts of petrophysics
- Depositional systems and petrophysical rock parameters
- Nature of porosity and permeability
- Basic rock properties; theory and quicklook techniques
- Mudlogging
- Core analysis, acquisition, interpretation, and quality checks
- Theory and basics of resistivity, radioactivity, acoustic tools
- LWD/MWD versus open hole logging
- Determination of rock types using core and logs
- Petrophysical impact on economic uncertainty
- Evolving petrophysical technologies
- Overview of cased hole logging

2016 Schedule and Tuition / 5 Days

CALGARY, CANADA	18-22 APR	US$4000+GST
HOUSTON, US	11-15 APR	US$4040
	20-24 JUN	US$4040
	31 OCT-4 NOV	US$4040
LONDON, UK	7-11 MAR	US$4670+VAT

Coring and Core Analysis – CCA

FOUNDATION FIELD TRIP

More than three-quarters of current additions to the world's reserves come from better management of existing reserves. Core-based measurements offer the most tangible and direct means of determining critical reservoir parameters. Core analysis can play a vital role in field equity or unitization and is often considered to be the ground truth to which other measurements are compared (e.g., wireline logging). Using a multidisciplinary approach, participants are taken through the steps necessary to obtain reliable core analysis data and solve formation evaluation problems. Throughout the course, participants are given hands-on problems and practical laboratory and field examples, which reinforce the instruction. *Laboratory visit with core analysis measurement demos (where feasible).

DESIGNED FOR

Petrophysicists, reservoir engineers, exploration and development geologists, core and log analysts, geophysicists, drilling and completion engineers, and oil company research and development staff.

YOU WILL LEARN HOW TO

- Design coring programs and maximize core recovery
- Preserve core to minimize rock alteration
- Take and analyze sidewall cores
- Use cores to estimate porosity, permeability, and fluid saturation (basic core analysis)
- Understand special core analysis (e.g., wettability, relative permeability, capillary pressure, and reservoir fluid distribution for reservoir engineering and petrophysical evaluation)
- Prevent/spot errors in core analysis vendor reports (quality control)
- Select samples for special core studies
- Correlate core and log data

COURSE CONTENT

Coring and core analysis objectives • Coring hardware and maximizing core recovery • Core-handling, wellsite procedures, and preservation methods • Sidewall coring and analysis • Organizing effective laboratory programs • Porosity, permeability, and fluid saturation • Unconventional Reservoir Analytical Protocol • Quality control in core analysis • Petrography and mineralogy • Special core analysis sample selection and statistical data analysis • Core-log correlation (includes NMR log calibration, acoustic, nuclear, and electrical properties) an introduction to rock mechanics • Wettability, relative permeability, capillary pressure, and reservoir fluid distribution • Data integration in reservoir simulation • Final problem: design of coring and core analysis program

2016 Schedule and Tuition / 5 Days

HOUSTON, US †	28 MAR-1 APR	US$4165
	19-23 SEP	US$4165

† includes field trip

Well Log Interpretation – WLI

FOUNDATION

The most universal, comprehensive, and concise descriptive documents on oil and gas wells are logs. They impact the work of almost every oilfield group from geologists to roustabouts to bankers. Familiarity with the purposes and optimum applications of well logs is, therefore, essential for people forging their careers in the oil business. The instructor uses a novel approach to help participants develop a good grounding in understanding and applying well logging techniques. General principles of physics are presented to explain the functioning of modern logging tools. Wherever possible, the physics of logging measurements is related to everyday tools and applications. Participants develop an appreciation for the constraints and limitations of operating in the borehole environment. A number of actual log examples are related to basic principles in the description of reservoir properties such as porosity, mineralogy, formation factor, saturation, and hydrocarbon type for essentially clean reservoirs. Cross-plotting and reconnaissance techniques quickly and efficiently discriminate between water, oil, and gas. Error minimization techniques, applicable only to computerized log analysis, produce optimal results. Participants gain realistic experience by working in teams on a comprehensive log interpretation exercise.

DESIGNED FOR

Petrophysicists, geologists, geophysicists, engineers, technicians, or anyone interested in a solid understanding of the principles of borehole geophysics

YOU WILL LEARN HOW TO

- Identify reservoirs
- Determine mineralogy, porosity, and saturation in various lithologies
- Recognize the importance of electrical properties of earth materials
- Highlight oil mobility
- Interpret pressure profiles
- Develop optimum tools and logging programs
- Apply quick-look methods of formation evaluation

COURSE CONTENT

Logging objectives • Invasion profile • Challenge of borehole geophysics • Passive electrical properties of earth materials • Resistivity measuring tools, normal, induction, laterolog • Reservoir/non-reservoir discrimination • Matrix-sensitivity logs, GR, SGR, Pe • Depth measurements and control • Borehole calipers • Porosity-mineralogy logs, density, neutron, sonic • Porosity determination in clean formations • Formation resistivity factor • Conductivity of shales • Porosity log crossplots and mineralogy identification • Partially saturated rock properties and Archie Equation • Linear movable oil plot • Reconnaissance techniques, Rwa, FR/FP, logarithmic scaler • and more

2016 Schedule and Tuition / 5 Days

ABERDEEN, UK	1-5 FEB	US$4670+VAT
CALGARY, CANADA	25-29 APR	US$4000+GST
HOUSTON, US	7-11 MAR	US$4040
	6-10 JUN	US$4040
	25-29 JUL	US$4040
	7-11 NOV	US$4040
KUALA LUMPUR, MY	22-26 AUG	US$4835
LONDON, UK	5-9 DEC	US$4670+VAT

Petrophysics of Unconventional Reservoirs – PUR

INTERMEDIATE

Petrophysics is central to the integration of a wide spectrum of related geoscience and engineering disciplines. However, students should also be familiar with at least two or more of the following topics: horizontal well drilling, wireline logging and log analysis, coring and core analysis, petrophysics, geophysics, geochemistry, formation testing, rock mechanics, hydraulic fracturing, and petroleum economics.

DESIGNED FOR

Geoscientists involved with the evaluation and exploitation of unconventional reservoirs including tight gas sands, shale gas, and coal-bed methane.

YOU WILL LEARN HOW TO

- Interpret petrophysical data gathering from unconventional reservoirs from both core and log data
- Assess TOC and maturity indicators
- Evaluate measurement provided by service companies
- Gauge gas-in-place and reserves in unconventional reservoirs
- Consequences and magnitudes of shale anisotropy
- Interpret NMR and capillary pressure measurements made on shale
- Interpret microstructural imaging of shale

COURSE CONTENT

Overview of unconventional reservoirs • Geochemistry of unconventional rocks • Special coring and core analysis techniques for unconventionals • Wireline logging of unconventional reservoirs • Assessment of formation organic content (TOC) and maturity • Gas-in-place and reserve and flow potential estimates • Geomechanics and fracturing

2016 Schedule and Tuition / 3 Days

HOUSTON, US	13-15 JUN	US$3075

Structural and Stratigraphic Interpretation of Dipmeters and Borehole-Imaging Logs – SSI

INTERMEDIATE

Dipmeters are micro-resistivity logs that detect the orientations of bed boundaries and borehole elongations. Borehole-imaging logs provide video, density, gamma-ray, acoustic, and/or electrical images of the borehole face. Dipmeters and borehole images can be run in water-based or oil-based mud; on wireline or LWD. They are used structurally to detect, orient, and quantify natural and induced fractures, faults, fold axes, unconformities, and in situ stress. Stratigraphically, dipmeters and borehole images are used to identify paleocurrent directions, bounding surfaces, facies, thin beds, net-sand, and secondary porosity. The key objective of dipmeter and borehole-image interpretation is to describe structural and stratigraphic features encountered by a wellbore, commonly in the absence of core. This course provides numerous hands-on exercises and case studies that emphasize sedimentologic, stratigraphic, and structural applications of these widely run, but generally underutilized logging tools.

DESIGNED FOR

Petrophysicists, geologists, geophysicists, and team members involved in reservoir characterization.

YOU WILL LEARN HOW TO

- Interpret dipmeters and borehole-imaging logs and understand the physical principles behind them
- Detect and quantify faults and fractures, determine in situ stress orientations, improve horizontal well placement, provide input into flow simulations
- Determine paleocurrent orientations, define stratigraphic compartments, quantify vuggy porosity, detect thin beds, analyze depositional characteristics, interpret image facies
- Apply image data in reservoir characterization

COURSE CONTENT

Applications and types of dipmeters and borehole images • Data acquisition and processing • Quality control and artifacts • Generation and use of stereonets and rose diagrams • Quantitative analysis using cumulative dip plots, vector plots, and SCAT plots • In situ stress from borehole breakout and drilling induced fractures • Horizontal wells • Identification and classification of fractures, faults, sub-seismic scale faults, micro-faults, and unconformities • Fracture spacing and wellbore bias correction • Thin bed analysis and net-sand counts • Carbonate porosity and facies interpretation • Sedimentology from borehole images: burrows, cross beds, scoured surfaces, slumps • Determination of paleocurrent directions • Interpretation of borehole images in various depositional settings • Application of image data in geocellular modeling and reservoir characterization • Integration of image data with core, mapping, seismic, petrophysical, and production data

2016 Schedule and Tuition / 5 Days

HOUSTON, US	14-18 MAR	US$4190

Integration of Rocks, Log and Test Data – ILC

INTERMEDIATE

This course provides the background necessary to address the more complex reservoir evaluation and productivity challenges within Exploration, Field Appraisal, and Field Development. The key fundamentals of rock properties, logging tools, and engineering data required to solve these problems are reviewed. The concepts are illustrated with a series of real world examples that become increasingly complex as knowledge is gained in the class. Emphasis is placed on solving problems in a workshop format.

DESIGNED FOR

Petrophysicists, petroleum reservoir engineers, geologists, and geophysicists who have a basic understanding of petrophysics, geology, and engineering and need a more advanced understanding of how to integrate the different data sets together to more completely understand reservoir performance. It is recommended that participants have a basic knowledge of logging fundamentals. The basics of logging will be reviewed in the class.

YOU WILL LEARN HOW TO

- Identify clastic and carbonate rock types based on productivity differences
- Determine the key reservoir rock parameters needed for a more accurate reservoir evaluation
- Use cuttings, sidewall cores, and cores to determine reservoir parameters
- Design an integrated interpretation
- Calculate Vclay
- Calculate porosity using porosity logs in complex lithologies
- Determine what percentage of porosity contributes to production
- Calculate Sw using different methods
- Determine pay and pay classes
- Tie rock and well log information to production performance

COURSE CONTENT

Objectives of integration • Key rock properties for formation evaluation • Impact of depositional environment and rock properties • Petrophysical rock type • Texture, porosity, and permeability • Clay impact • Summary of basic logging tools • Subsurface rock sampling • Use of subsurface pressure data and evaluation • Relative permeability • Capillary pressure application to pay determination • Basic methodology for an integrated interpretation • Rock typing • Catalog approach • Clastic and carbonate rock types • Important reservoir rock parameters • Cementation and saturation components—CEC—fluid sensitivity • Review of production profiles • Overview of pressure transient analysis • Calculation of Vclay/Vshale calibration of core and logs • Calculation of porosity using porosity logs in complex lithologies • What is effective porosity? • Calculation of SW using different methods • Determining pay and pay classes

2016 Schedule and Tuition / 5 Days

HOUSTON, US	9-13 MAY	US$4140
	14-18 NOV	US$4140
LONDON, UK	22-26 AUG	US$4770+VAT

Wireline Formation Testing and Interpretation – WFT

SPECIALIZED

Over the past two decades, modern tools, such as MDT, RCI, RDT, and FRT, have emerged to become as one of the critical formation evaluation means in drilling projects with high cost/risk and high reward environments. In recent years, FT tools while-drilling provide alternatives of formation testing at earlier timing, flexible operational sequences in complicated wellbores access to reservoirs. FT pressure data and fluid samples are acquired for predicting hydrocarbon resource sizes and accessing key development uncertainties. This course is designed to satisfy the interdisciplinary needs of geoscientists, petrophysicists, and reservoir engineers with an increasing use of FT data. Practical and hands-on exercises are worked in the class.

DESIGNED FOR

Geoscientists, petrophysicists, wellsite supervisors, reservoir engineers, and geodata technologists of multidisciplinary formation evaluation and development teams engaging in explorations, appraisals, and field development activities.

YOU WILL LEARN HOW TO

- Apply formation testing and sampling: technologies, applications, and limitations
- Understand how FTs work; configure tool strings and design/ plan a test program
- Perform QA/QC pressures and sampling data in real-time
- Interpret pressure gradient data for fluid densities and contact levels
- Understand reservoir connectivity/continuity and compartmentalization
- Quantify uncertainties of data interpretation results
- Interpret graphical techniques (scatterplot, excess pressures, normalization)
- Design and interpret Mini-DST and VIT data

COURSE CONTENT

Why formation testing and sampling • How FT tools work; measurement principles; test types; drawdown mobility; data quality QA/QC • Pressure fluid gradient and contact level interpretation principles • Graphical pressure interpretation techniques: scatter-plot for gradient, FWL, and compositional gradient; excess pressure plot for compartmentalization; normalization plot for depleted reservoir • Multiple well pressure trends for reservoir compartmentalization, continuity, and extent • Qualification and quantification of interpretation uncertainties • Mud filtration phenomena dynamics; dynamic gradient; supercharging; wettability/capillary effects • Optical property measurement of reservoir fluids and contamination control; sampling principles and fluid sample QA/QC procedures; in-situ fluid PVT analysis • Permeability test; mini-DST and VIT; practical aspects of well productivity and deliverability potential estimates

2016 Schedule and Tuition / 5 Days

HOUSTON, US	7-11 MAR	US$4240

Basic Reservoir Engineering – BR

BASIC

Basic Reservoir Engineering is a course designed to help the participants develop a more complete understanding of the characteristics of oil and gas reservoirs, from fluid and rock characteristics through reservoir definition, delineation, classification, development, and production. Data collection, integration, and application directed toward maximizing recovery and Net Present Value are stressed. Basic reservoir engineering equations are introduced with emphasis directed to parameter significance and an understanding of the results. The course includes class exercises designed to be solved with a calculator or spreadsheet. Participants are welcome to bring their own laptop computers.

DESIGNED FOR

Geologists, geophysicists, engineers, engineering trainees, technical managers, technical assistants, technicians, chemists, physicists, technical supervisors, service company personnel, sales representatives, data processing personnel, and support staff working with reservoir engineers and wanting to understand the process of reservoir definition, development, and production, or engineers newly placed in a reservoir engineering position.

YOU WILL LEARN

- How to collect and analyze the data needed for reservoir engineering tasks
- The fundamentals of fluid flow in porous media
- How reservoirs are characterized by fluid type and drive mechanisms
- The basis for reservoir fluid distribution
- About oil and gas well performance and pressure buildup analysis
- About oil displacement and optimizing reservoir performance
- The basics of enhanced oil recovery
- How oil and gas in place can be estimated and recovery predicted

COURSE CONTENT

Reservoir fluid properties • Coring practices and reservoir rock properties • Fundamentals of fluid flow • Reservoir fluid distribution • Reservoir classification • Reservoir drive mechanisms • Oil and gas well performance, including inflow and outflow concepts • Pressure buildup analysis • Oil displacement concepts • Estimation of oil-in-place and gas-in-place • Recovery techniques

2016 Schedule and Tuition / 5 Days

ABERDEEN, UK	12-16 DEC	US$4570+VAT
BAKERSFIELD, US	7-11 NOV	US$3900
CALGARY, CANADA	7-11 MAR	US$3900+GST
DENVER, US	23-27 MAY	US$3950
HOUSTON, US	1-5 FEB	US$3940
	4-8 APR	US$3940
	8-12 AUG	US$3940
	28 NOV-2 DEC	US$3940
JOHANNESBURG, SOUTH AFRICA	5-9 SEP	US$5230
KUALA LUMPUR, MY	22-26 AUG	US$4735
LONDON, UK	21-25 MAR	US$4570+VAT
PERTH, AUSTRALIA	8-12 FEB	US$4800+GST

Production Technology for Other Disciplines – PTO

FOUNDATION

PTO is an asset team course as it introduces a broad array of important daily Production Technology practices to team members. Terminologies, expressions, axioms, and basic calculations regularly utilized by production techs are covered throughout the course. Emphasis is upon proven technology required to effectively develop and operate an asset in a multidiscipline development environment. Practical application of technology is emphasized. Both theory and actual field examples and well completion programs are studied along with class problems, exercises, and videos. Nodal analysis examples to assess well performance are set up. Well completion equipment and tools are viewed and discussed. Participants work several exercises such as basic artificial lift designs, acidizing programs, gravel pack designs, and fracturing programs. Shale gas and oil development challenges are thoroughly explained. Horizontal and multilateral technology is presented.

DESIGNED FOR

Exploration and production technical professionals, asset team members, team leaders, line managers, IT department staff who work with data and support production applications, data technicians, executive management, and all support staff who require a more extensive knowledge of production technology and engineering.

YOU WILL LEARN HOW TO

- Apply and integrate production technology principles for oilfield project development
- Choose basic well completion equipment configurations
- Perform system analyses (Nodal Analysis™) to optimize well tubing design and selection
- Perform basic artificial lift designs
- Apply the latest shale gas and oil extraction technologies
- Understand the chemistry and execution of sandstone and carbonate acid jobs
- Design basic sand control gravel pack completions
- Evaluate well candidate selection to conduct a hydraulic fracturing campaign
- Apply new production technology advances for smart well completions
- Maximize asset team interaction and understand the important dynamics between production technology and other team member disciplines

COURSE CONTENT

Role and tasks of production technology • Completion design • Inflow and outflow performance • Artificial lift well completion systems (beam pump, gas-lift, ESP, PCP, plunger lift) • Formation damage and well acidizing • Perforating practices • Sand control • Hydraulic fracturing • Shale gas and oil development • Smart well completions • Field surveillance and data

2016 Schedule and Tuition / 5 Days

HOUSTON, US	8-12 AUG	US$4065*
KUALA LUMPUR, MY	17-21 OCT	US$4860*
THE HAGUE, NETHERLANDS	14-18 NOV	US$4695*

*plus computer charge

Basic Drilling Technology – BDT

BASIC

FIELD TRIP

This basic drilling technology course addresses the technology used to drill wells from a fundamental view point. Equipment and procedures involved with drilling oil and gas wells are described for those who are interested in understanding the drilling process regardless of academic background. During the first day, the overall drilling process is presented along with definitions and descriptions of drilling equipment. This provides the vocabulary to understand the drilling process. During the remainder of the week, the various components and procedures are discussed in greater detail with explanations of the basic science concepts which guide these processes. Subjects include descriptions of drill bits, directional drilling, drilling fluids, solids control, cementing, casing, well bore stability, well control, measurement-while-drilling techniques, stuck pipe, lost circulation, and well bore hydraulics. Some technology enhancements are included to improve understanding of drilling operations for all participants, with or without a science background. A discussion of clay mineralogy helps understand well bore instability and drilling fluids. A discussion of pressure and pressure effects helps explain many of the procedures and problems associated with drilling wells. Rocks behave differently under pressure and understanding this behavior helps in understanding drilling performance.

Some discussions of the art and science of drilling include mathematical explanations for those involved with the engineering aspects of drilling operations; however, the concepts and intent of these mathematical equations will also be explained in simple terms. After all various components and procedures are discussed, the information contained in morning reports is explained and used as a summary of the course content.

DESIGNED FOR

Petroleum and production engineers, completion engineers, geoscientists, managers, technical supervisors, service and support personnel, entry level drilling engineers, drilling operations personnel, drilling office support staff.

YOU WILL LEARN

- About drilling equipment and how it is used
- Drilling terminology and abbreviations
- Keys to planning a successful well
- Common drilling problems and how to avoid them
- How to read a morning report
- Technology behind information in a morning report

COURSE CONTENT

- The overall drilling process and equipment
- The language of drillers—understanding their terminology
- Understanding the abbreviations and acronyms associated with drilling
- Rig equipment and types
- Types of drill bits
- MWD
- Drill strings
- Drilled solids management
- Mud tank arrangements
- Drilling fluid properties
- Well control
- Cementing
- Casing design
- Hole problems (stuck pipe, lost circulation)
- Well control
- Directional drilling operations and tools
- Safety

2016 Schedule and Tuition / 5 Days

HOUSTON, US †	22-26 FEB	US$3940
	18-22 APR	US$3940
	18-22 JUL	US$3940
	19-23 SEP	US$3940
	7-11 NOV	US$3940

† includes field trip

Well Test Design and Analysis – WTA

FOUNDATION

This course stresses practical application of well test theory to design and interpret pressure transient tests. An integrated approach to well test interpretation is emphasized throughout the course. Class exercises involving hand calculations and simple spreadsheet applications will reinforce the concepts illustrated by both synthetic data sets and real field examples. Participants will be able to apply the knowledge and skills they gain in this course to their job assignments upon course completion.

DESIGNED FOR

Engineers and geoscientists who want to understand well testing principles and interpretation techniques to design, analyze, report, evaluate results or intelligently participate in the well testing process. Previous experience in production and/or reservoir engineering is recommended. Previous experience in well testing is helpful but is not required.

YOU WILL LEARN HOW TO

- Analyze drawdown and buildup tests in oil and gas wells
- Identify flow regimes using the log-log diagnostic plot
- Describe characteristic pressure behavior for common bounded reservoir geometries
- Identify well test data affected by various wellbore and near-wellbore phenomena
- Design a well test to meet desired objectives
- Estimate average drainage area pressure
- Analyze well tests in hydraulically fractured wells, horizontal wells, and naturally fractured reservoirs

COURSE CONTENT

Introduction to well testing • Radial flow • Log-log type curve analysis • Pressure transient testing for gas wells • Flow regimes and the log-log diagnostic plot • Bounded reservoir behavior • Wellbore and near-wellbore phenomena • Well test interpretation • Well test design • Estimation of average drainage area pressure • Hydraulically fractured wells • Horizontal wells • Naturally fractured reservoirs

2016 Schedule and Tuition / 5 Days

HOUSTON, US	12-16 SEP	US$4065*

*plus computer charge

Integrated Reservoir Modeling – GRD

INTERMEDIATE

A proper development of reservoir description is helpful in managing daily operations of the asset, as well as long-term planning. Integration involves using all the available information about the reservoir to develop better understanding of the reservoir. This process is inherently interdisciplinary and requires understanding of all the disciplines. Starting with collecting information and assessing the need for additional data, the course will cover all the topics from structural and geological modeling, estimation of reservoir petrophysical properties using geostatistical tools, upscaling to simulator model and finally, proper history matching and future predictions in the presence of uncertainties. This course is important to reservoir modelers involved in any phase of the description work. This is intended to expose various geoscientists and engineers to the entire process of integrated reservoir description and the geostatistical tools that can be used to achieve the goals. The course will develop improved appreciation of the other disciplines' needs as well as the necessity of the feedback during the integration process. The instructor of this course is willing to accept examples from your company for analysis in the class as one of the demonstration exercises.

DESIGNED FOR

Geologists, geophysicists, engineers, petrophysicists or others involved in reservoir modeling.

YOU WILL LEARN HOW TO

- Develop the work flow in the reservoir integration process
- Evaluate and quantify uncertainties in various sources of data
- Build a geo-cellular model using geostatistical tools and upscale it to capture essential
- Heterogeneities
- Develop criterion for objective history matching
- Utilize seismic data in different phases of reservoir description and integrate them using geostatistics
- Use various description tools in a judicious manner
- Use public domain software to apply many of the techniques discussed in class

COURSE CONTENT

Basic statistical principles • Spatial modeling • Structural modeling • Estimation of properties at well locations • Conditional simulation • Facies/rock type modeling • Petrophysical properties simulation • Ranking of realizations • Construction of simulator input model • History matching • Future predictions and quantification of uncertainty

2016 Schedule and Tuition / 5 Days

HOUSTON, US	5-9 DEC	US$4140*

**plus computer charge*

Reservoir Characterization: A Multi-Disciplinary Team Approach – RC

INTERMEDIATE

The modern team approach to Reservoir Characterization describes productive zones more reliably through the integration of disciplines, technology, and data. Increase your proven reserves, discover by-passed pay, reduce development time and costs, improve production rates, and rejuvenate old fields through the skills learned in this course.

During the course, particular attention will be paid to uncertainties and risks. It will be shown how these can be handled and their impact on the economics of hydrocarbon projects. The instructor is willing to accept examples from your company for analysis in the class as one of the demonstration exercises. It is also possible to design a course specifically for your own company around such a case study. Please contact PetroSkills for a list of the information and support data required, as well as the necessary lead-time.

DESIGNED FOR

Geologists, geophysicists, reservoir engineers, production engineers, petrophysicists, exploration and production managers, team leaders, and research scientists.

YOU WILL LEARN HOW TO

- Develop a business proposal for any Reservoir Characterization project
- Apply the concept of correlation length to understand reservoir continuity
- Define hydraulic flow units in a reservoir
- Assess the economics of oil and gas projects across their entire life cycle
- Carry out the integrated Reservoir Characterization process

COURSE CONTENT

Business value drivers and selection criteria • The scale and resolution of data • Variograms, correlation length • Time, rock, and flow units • Seismic attributes • Upscaling, streamline simulation • Decision trees; value of Information • Giving and receiving feedback • The future of Reservoir Characterization

2016 Schedule and Tuition / 5 Days

HOUSTON, US	15-19 AUG	US$4140
LONDON, UK	25-29 JUL	US$4770+VAT

Essential Technical Writing Skills – ETWS

BASIC

Writing for work-related purposes ought to be brief, clear, informative and above all, readable. In this practical hands-on course, you gain a solid foundation in technical writing skills. The primary theme for the course is that a writer must "think constantly about their readers." Examples and exercises provide hands-on experience. You may choose to bring a sample of your writing for one-on-one feedback.

DESIGNED FOR

All engineers, managers, IT/computer support staff, team leaders, supervisors, and individuals responsible for writing letters, memos, reports, procedures, test results, and proposals that are clear, concise, and professional.

YOU WILL LEARN HOW TO

- Focus on the reader as the receiver of the information
- Develop quality writing that will:
- Improve business relationships and communication
- Write better and faster
- Make your writing more credible
- Make you more confident in your writing

COURSE CONTENT

Develop essential technical writing skills to convey a convincing message • Compose clear messages using a structured writing approach • Adapt your writing style to your audience's needs • Edit at the word level to improve persuasiveness and impact • Write precise and concise memos, letters, summaries, and reports • How to best display visual information • Create informative content using lists, bullets, and short paragraphs as the primary writing mode

2016 Schedule and Tuition / 3 Days

HOUSTON, US	11-13 APR	US$2955

Introduction to Data Management – IDM

BASIC

This course provides an overview of data management in E&P, focusing on the subsurface domain. The need to deliver good data management is increasingly being seen as providing competitive advantage across the E&P industry, since wise business decisions depend on sound data and information. Participants will leave this course with an understanding of the core E&P data types, their use in the business, and data management issues and challenges facing companies. You will have the knowledge and tools necessary to participate in developing a structured data management framework, which will deal with these issues in a practical and effective manner to ensure business efficiency and value is realized. This course provides an understanding of essential E&P data management principles and concepts using an interactive classroom format; participants will have the opportunity to learn from presentations, exercises, and interactive discussions. Course instructors are experienced data management practitioners, who have delivered services and projects to many E&P companies, from small independents to super majors.

DESIGNED FOR

As this course is foundational it will be of most benefit to those with little or basic prior understanding of technical data used in the E&P industry. Course attendees may hold a variety of roles such as data or information managers, technical managers and assistants, technologists, geologists, geophysicists, etc.

YOU WILL LEARN

- What is data management, why it is important, understanding of data as an asset, its lifecycle, benefits of good data management, and its potential value
- The core data types in the E&P industry and valuable best practices for them
- Common data management issues and challenges, and the impact on the business
- The important components of a data management framework
- How to map issues onto a data management framework

COURSE CONTENT

Data types: definitions • Common data management issues: causes of data issues, data management best practices, business impact • Overview of data management: definition, data lifecycle, importance and value of data management, benefits of good data management, business case aspects and barriers • Data management framework: governance, architecture, security, reference and master data management, data quality management

See website for dates and locations.

Basic Petroleum Economics – BEC3

BASIC

Could you answer the following three questions for your next project? What will it cost? What is it worth? Will it earn sufficient profit? Before undertaking any project, these questions should be answered, and this course will provide the fundamentals necessary to enable you to do so. Contractual arrangements, which also significantly impact the economic viability of a project, are covered. Participants practice cash flow techniques for economic evaluations and investigate frequently encountered situations. Each participant will receive Economics of Worldwide Petroleum Production, written specifically for PetroSkills courses. Individuals may wish to participate in either this course or Expanded Basic Petroleum Economics, which is the five day version that includes expanded material covering finance, accounting, and budgeting.

DESIGNED FOR

Managers, engineers, explorationists, field accounting supervisors and other personnel who need to develop or improve their skill and understanding of basic economic analysis and profitability of petroleum exploration and production.

YOU WILL LEARN

- How to evaluate the economic viability of a project
- Cash flow techniques applicable in economic evaluations
- How to use economic criteria to choose investments
- Models to weigh risk and uncertainty

COURSE CONTENT

Forecasting oil production • Defining: "reserves", operating expenses, capital expenditures, inflation, factors effecting oil and gas prices • Cash flow techniques • Economic criteria: interest, hurdle rate, time value of money, selection, ranking criteria • Risk, uncertainty: types of risk, mathematical techniques, probabilistic models, uncertainty in economic analysis • Tips on economic factors in computer spreadsheet analysis • Ethics in economic analyses

2016 Schedule and Tuition / 3 Days

CALGARY, CANADA	11-13 APR	US$2925+GST
DENVER, US	8-10 AUG	US$2955
HOUSTON, US	1-3 FEB	US$2955
	2-4 MAY	US$2955
	11-13 JUL	US$2955
	10-12 OCT	US$2955
KUALA LUMPUR, MY	15-17 AUG	US$3550
LONDON, UK	6-8 JUN	US$3430+VAT
	12-14 SEP	US$3430+VAT
SAN FRANCISCO, US	14-16 NOV	US$2925

Geomatics: Geodesy and Cartography – GEOM1

FOUNDATION

Use of incorrect geodetic parameters can cause major errors in positions of wells, pipelines, and seismic surveys, with significant financial losses and sometimes with HSE risks, as demonstrated by case studies. Awareness of geodetic datums, coordinate reference systems, and map projections is provided via interactive demonstrations and hands-on workshop exercises using the online EPSG Geodetic Registry. Students learn how Global Navigation Satellite Systems (GNSS) including GPS work, as well as the resultant accuracies obtainable using different receiver types and data processing techniques. Hands-on GPS exercises show potential errors. "Google Earth" is examined with focus on its strengths and weaknesses for E&P purposes. Lastly, the importance of geospatial metadata is stressed, since often such metadata is implemented at the end of a project. This critical geospatial data component is discussed with recommendations for "best practices" using current industry references.

DESIGNED FOR

Geologists, geophysicists, exploration and production managers, reservoir engineers, drilling engineers, data acquisition and data managers, and GIS specialists.

YOU WILL LEARN

- To identify "bad" geodetic parameters within your project data, and ensure that geodetic parameters provided to you are correct
- Advantages and disadvantages of using various map projections
- To apply this course to projects in your specific geoscience software applications
- Evaluation of geospatial metadata in your projects; learn how to generate good geospatial metadata
- The limitations on "reasonable use" of Google Earth for your own applications
- The accuracy limits of different types of GNSS/GPS receivers and technology

COURSE CONTENT

How much trouble coordinate errors can cause (with case studies) • Key geomatics/geodesy definitions • Geospatial reference surfaces • Geodetic datums, coordinate reference systems, and transformations • Global Navigation Satellite Systems (GNSS), including GPS • Map projection methods • What is "North" • Effects of different linear units • Vertical datums, geoidal models, vertical CRS, and transformations • Google Earth and associated geospatial data issues • Geospatial metadata: what is it and how can it be made part of the normal workflow process • Recap and course references

See website for dates and locations.

Team Leadership – TLS

FOUNDATION

This program will develop and refine the skills essential for leading a high performance team. Emphasis is placed on the leader's role in effectively enhancing total team functionality and maximum team productivity. Individual communication styles will be assessed and examined to identify the most appropriate communication style to use with your team. This will be an active experience. In addition to receiving individual assessment information, participants will be exposed to team concepts, theories, and skill development through the use of lectures, videos, readings, role plays, case studies, and discussions. This course has been constructed to maximize opportunity to improve both knowledge and practical skills in leading a team and being a team player. (This is a great course to attend immediately following PetroSkills' course titled: Leading and Managing Others.) In addition to this program designed specifically for Team Leaders, PetroSkills has a two day course titled: Team Building for Intact teams.

DESIGNED FOR

Team leaders, supervisors, managers, and others responsible for leading a team and interested in establishing and/or being a part of a highly productive team.

YOU WILL LEARN HOW TO

- Characterize high performance teams
- Gain clarity of goal and worthiness
- Develop a team charter
- Gain commitment
- Build team collaboration and trust
- Establish operational norms
- Recognize stages of team development
- Define team roles and relationships
- Understand system influences
- Promote conditions for effective team building
- Conduct individual and team assessments
- Improve team communications
- Improve group dynamics
- Develop personal plans to improve team effectiveness
- Foster team leadership
- Monitor team progress

COURSE CONTENT

Definition and purpose of teams • Characteristics of a high performance team • Gaining clarity of goal and worthiness • Developing a team charter • Gaining commitment • Team collaboration and trust • Establishing operational norms • Stages of team development • Team roles and relationships • System influences • Conditions for effective team building • Individual and team assessments • Team communications • Group dynamics • Developing a personal team leadership plan • Monitoring team progress • Developing a team leadership action plan

See website for dates and locations.

Petroleum Risk and Decision Analysis – PRD

FOUNDATION

Good technical and business decisions are based on competent analysis of project costs, benefits and risks. Participants learn the decision analysis process and foundation concepts so they can actively participate in multi-discipline evaluation teams. The focus is on designing and solving decision models. 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. Monte Carlo simulation is discussed and experienced in detail in a hand-calculation exercise. Project modeling fundamentals and basic probability concepts provide the foundation for the calculations. Emphasis is on practical techniques for immediate application.

DESIGNED FOR

Geologists, engineers, geophysicists, managers, team leaders, economists, and planners.

YOU WILL LEARN HOW TO

- Describe the elements of the decision analysis process and the respective roles of management and the analysis team
- Express and interpret judgments about risks and uncertainties as probability distributions and popular statistics
- Represent discrete risk events in Venn diagrams, probability trees, and joint probability tables
- Solve for expected values with decision trees, payoff tables, and Monte Carlo simulation (hand calculations)
- Craft and solve decision models
- Evaluate investment and design alternatives with decision tree analysis
- Develop and solve decision trees for value of information (VOI) problems

COURSE CONTENT

Decision Tree Analysis: decision models, value of 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' rule, calibration and eliciting judgments, choosing distribution types, common misconceptions about probability • Expected Value Concept: foundation for decision policy, features, 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)

2016 Schedule and Tuition / 5 Days

HOUSTON, US	11-15 APR	US$4040
	11-15 JUL	US$4040
	28 NOV-2 DEC	US$4040
KUALA LUMPUR, MY	22-26 AUG	US$4835
LONDON, UK	10-14 OCT	US$4670+VAT

Petroleum Project Management: Principles and Practices – PPM

INTERMEDIATE

Running a successful petroleum operation requires a blend of technology, business savvy, and people skills. If you already have a firm grasp of exploration or production technology, learn to amplify its effectiveness with applied project management techniques. This course is aimed at helping technical personnel make the best business decisions that lead to lowest project cost while still meeting all production or exploration goals. Petroleum Project Management covers the principles and application of project management to the upstream oil and gas business. Participants may choose a case study from a number of real-life exploration, production, facilities, and general management situations, or they may bring the details of one of their own current projects. Because of this experience with practical situations, participants can use these project management principles their first day back on the job.

DESIGNED FOR

Exploration, production, and management personnel interested in applying project management techniques to their operations. If you are a facilities engineer, we refer you to our Project Management for Engineering and Construction (FPM22) and Project Management for Upstream Field Development (FPM2) courses.

YOU WILL LEARN HOW TO

- Properly define a project's scope
- Use project management tools to create a project schedule to meet goals, deliverables, and resource constraints
- Use practical tools to identify and manage a project's risks
- Manage a project team
- Organize your project to capture lessons learned

COURSE CONTENT

The project management process • Scope definition • Scheduling tools • Manpower resources • Project risk management • Learning, continuous improvement, and quality management in projects • Project team management • Case studies and exercises

2016 Schedule and Tuition / 5 Days

HOUSTON, US	7-11 NOV	US$4140*
KUALA LUMPUR, MY	3-7 OCT	US$4935*

*plus computer charge

Basics of Environment – HS13

BASIC

Provide proof of your environmental credentials anywhere in the world with the NEBOSH Certificate in Environmental Management. Our program starts in advance of the taught course, as participants undertake a review of their own site's environmental performance using documentation supplied to them. This review sets the context for this five day class, which comprises a blended learning approach with tutorials, workshops, problem-solving and practical activities. At the end of the course, there is a formal examination and project, successful completion of which results in the award of the NEBOSH Certificate in Environmental Management.

DESIGNED FOR

Managers, supervisors, and employees throughout the world who have responsibility for managing environment issues as part of their day to day duties. This course is particularly suitable for entry level HSE professionals, as the NEBOSH Certificate in Environmental Management is the first step in a career in environmental management.

YOU WILL LEARN

- Environmental management, and what this means for your organization
- Ethical, legal, and financial reasons for maintaining and promoting environmental management
- The importance of sustainability
- Principles and sources of environmental information
- The purpose and importance of setting environmental policy
- Key features and content of an effective environmental management system (EMS) such as ISO 14001
- Active (leading) and reactive (lagging) monitoring, including inspections and investigations of environmental incidents
- Environmental impact assessments (EIA)
- Emissions to atmosphere and abatement measures
- Water pollution and methods to avoid contamination of water resources
- The importance of and techniques for minimizing waste
- Risks associated with contaminated land
- Energy efficiency
- Potential sources and consequence of environmental noise and nuisance
- Emergency preparedness and response
- Environmental auditing, and reporting the results to management
- NEBOSH examination and project (optional).

COURSE CONTENT

Foundations in environmental management • Environmental management systems • Assessment of environmental impacts • Control of emissions to air • Control of contamination of water resources • Solid waste and land use • Sources and use of energy and energy efficiency • Control of environmental noise • Planning for and dealing with environmental emergencies • NEBOSH Examination and Project

nebosh Accredited Centre 490

2016 Schedule and Tuition / 5 Days

LONDON, UK	6-10 JUN	US$4770+VAT

Basics of HSE Management – HS18

BASIC

Recognition and effective management of HSE risks/impacts is a fundamental requirement of companies operating in our sector.

This course provides participants with the underpinning knowledge on how to specify and implement an effective HSE management system at the technical level. The course is based upon a common HSE management system which explains the elements and their interaction.

A variety of exercises and case studies based on our Petros on- and off-shore case studies, as well as readings and videos will be used to develop understanding and practice the skills.

The course is designed for the oil, gas and petrochemicals industries around the PetroSkills competence maps for HSE Management at the "Awareness" level.

This class can be taken alone, or together with our Basics of Safety (HS10). It provides the underpinning knowledge for participants seeking a career first-step qualification - the NEBOSH International General Certificate in Occupational Health and Safety (IGC).

For holders of the NGC gained within the last five years, this class provides for conversion to the IGC (upon request).

DESIGNED FOR

All workers requiring basic awareness and/or a qualification in HSE management. These may include field/operations staff, office workers, engineers, supervisors, project managers, and aspiring HSE professionals.

It is ideal for anyone with no prior HSE management knowledge.

YOU WILL LEARN

- The principle elements of an HSE management system, and how these interact to promote performance improvement
- How to use ISO 14001, OHSAS 18001/ISO 45001, HSG65, and ILO OSH-2001
- Key tools for assessing risks, risk control, and active/reactive monitoring
- The roles and responsibilities of individuals within the management system and how these can affect the safety culture of the organization
- Examination techniques for the NEBOSH IGC1 exam (if required)

COURSE CONTENT

Leadership, policy, objectives • Responsibilities, resources and competence • Risk assessment and control • Planning, safe systems of work • Contractor controls • Emergency preparedness and response • Incident reporting and investigation • Inspections and audits • Management review

2016 Schedule and Tuition / 5 Days

LONDON, UK	14-18 MAR	US$4570+VAT
	12-16 SEP	US$4570+VAT

Applied Safety – HS20

FOUNDATION

This course teaches participants about a selection of advanced safety tools and facilitates practice use of these in a case study setting.

During just five days, we learn about safety techniques for the oil, gas, and petrochemicals industries including the HSE case, Bowtie, JHA/JSA, HAZOP, fault, and event tree analysis.

We use a rich blend of exercises, problem-solving, videos, and case studies to support the learning in realistic situations. These come together to challenge participants in our case study scenario Petros Barola – see www.petrosbarola.com.

The class concludes with participants defending the company before the HSE regulator explaining why the company should retain its operating license following a serious incident.

The course content is built around the PetroSkills competence maps at the Fundamental Application level. It may be taken either independently or in conjunction with other Foundation level courses - Applied HSE Management, Applied Health, and/or Applied Environment.

This course also provides practical learning for participants seeking professional accreditation through our Accredited H&S Practitioner program (to CMIOSH) – HS70.

DESIGNED FOR

HSE specialists as well as operations engineers, supervisors and project managers, and other staff with responsibility for designing, implementing, or supporting safety techniques in their respective positions.

Some prior knowledge of safety science is desirable but not essential.

YOU WILL LEARN HOW TO

- Design and use a common set of safety techniques (as listed above)
- Apply factors relating to people, equipment, materials, and the working environment to the establishment of safe working environments
- Identify common asset safety hazards and design and implement systems to control and subsequently monitor these
- Conduct a fire risk assessment for their own facility
- Implement a motor vehicle safety program

COURSE CONTENT

Safety techniques for hazard and effect management • Safety culture and maturity; errors and violations, Stroop test • Creating safe work environments – hard and soft controls • Chemical handling / HAZCOM / product stewardship • Fire safety • Electrical safety • Confined space safety • Lockout and tagout (LOTO) • Logistics and motor vehicle safety • Measuring and improving safety performance

2016 Schedule and Tuition / 5 Days

HOUSTON, US	31 OCT-4 NOV	US$4040
LONDON, UK	22-26 FEB	US$4670+VAT

Applied Environment – HS23

FOUNDATION

This course provides hands-on opportunities to learn and apply tools, techniques, and systems of environmental management in oil, gas, and petrochemicals industries. Participants work as a member of a team to develop and improve the environmental management system (EMS) and environmental performance of company Petros, a fictitious but highly-realistic case study. Application of the learned techniques is practiced at the upstream Caspian Explorer platform and the downstream Orkney Depot.

Well-blended exercises, problem-solving, and scenarios are used to practice the application of learning in authentic situations. The course is designed to introduce participants to solutions to environmental challenges and to become an agent for change in their own organization.

The course follows-on from HS13, and is recommended for those developing a career in environmental management and/or planning to progress towards Full or Associate membership of the Institute of Environmental Management and Assessment (IEMA) using our Accredited Environmental Practitioner program (HS71).

DESIGNED FOR

Environmental professionals, H&S practitioners wishing to broaden their skills, operational managers, engineers, supervisors, project managers, and other staff who have delegated responsibilities for implementing environmental improvement(s).

YOU WILL LEARN HOW TO

- Apply environmental management systems and environmental controls which bring enhanced legal, financial, and reputational improvement
- Communicate effectively with management and staff at all levels of the organization on environmental improvement
- Incorporate EMS into strategic plans, operational activities, products, and services
- Identify environmental aspects, and how to assess the environmental impacts of activities, products, and services in normal, abnormal, and emergency situations
- Use an EMS to confirm legal compliance
- Plan and implement improvements in environmental performance
- Develop monitoring procedures and environmental performance indicators
- Develop and implement an environmental audit program
- Engage in environmental reporting, including use of recognized methods and formats for presenting reports internally and externally

COURSE CONTENT

Effective use of an EMS • Identifying aspects and assessing impacts • Environmental improvement programs, including pollution abatement and control techniques • Emergency preparedness and response • Environmental communication • Environmental performance monitoring • Environmental auditing and reporting • Management review

2016 Schedule and Tuition / 5 Days

HOUSTON, US	10-14 OCT	US$4040
LONDON, UK	11-15 APR	US$4670+VAT

Applied HSE Management – HS28

FOUNDATION

In just five days, learn how to develop and use an HSE management system to drive improvement and learning into your organization!

This course is about understanding and applying common HSE management systems in oil, gas and petrochemical industries. It includes a rich blend of knowledge development sessions, individual and team exercises, problem-solving, and sector case studies. These come together to challenge participants in a realistic but fictional case study facility, Petros Barola Limited – see www.petrosbarola.com

The course may be taken either independently or in conjunction with our Applied Safety, Applied Health, and/or Applied Environment courses.

This course also provides practical learning for participants seeking professional accreditation through our Accredited H&S Practitioner (to CMIOSH) or Accredited Environmental Practitioner programs (to MIEMA and CEnv) – HS70 and HS71 respectively.

DESIGNED FOR

Functional specialists seeking to improve their knowledge and application of HSE management systems, including operations supervisors, engineers, contract managers, project managers, and all staff who have the responsibility for designing, implementing, or supporting HSE management.

Some prior knowledge of HSE management related topics is desirable but not essential.

YOU WILL LEARN HOW TO

- Successfully apply the principle elements of an HSE management system aligned to the international standards ISO 14001 (environment) and OHSAS 18001 / ISO 45001 (occupational health and safety), and how to relate these to company management systems
- Explain responsibilities for HSE management and the characteristics of successful leadership and management styles
- Use key tools associated with HSE management including HazID, risk assessment, JHA, JSA, PTW, LOTO, and active (leading) and reactive (lagging) monitoring
- Shape and initiate improvement in the safety culture of their own organizations

COURSE CONTENT

Leadership and commitment • HSE policy and strategic objectives • Legislation and regulation • Organization, responsibilities, and resources • Professional training and behaviors • Risk assessment and hierarchy of control • Planning and procedures • Contractor controls • Security • Emergency preparedness and response • Performance management • Incident reporting and investigation • Auditing • Management review and improvement

2016 Schedule and Tuition / 5 Days

DUBAI, UAE	31 JUL-4 AUG	US$5090
HOUSTON, US	7-11 MAR	US$4040
KUALA LUMPUR, MY	25-29 JUL	US$4835
LONDON, UK	10-14 OCT	US$4670+VAT

PetroAcademy™ Blended Learning

PetroSkills Blended Learning Programs combine industry expertise, content, and technology to develop workforce competency with the added benefit of:

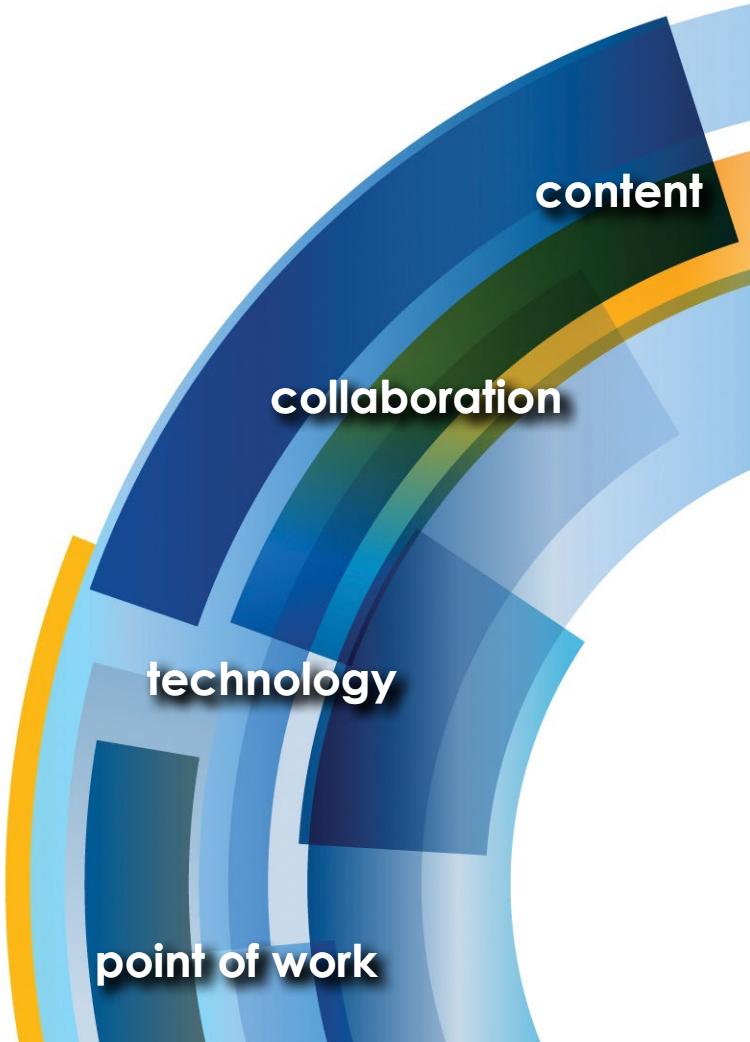
Reduced time to competency

Eliminated travel expense

Flexibility—less time away from work

Learning applied at point of need

See **petroskills.com/blended** for more information on PetroAcademy™ blended learning.



TO VIEW OUR COURSES IN OTHER DISCIPLINES, VISIT:

Subsurface

Introductory/Multi-Discipline
Geology
Geophysics
Petrophysics
Reservoir Engineering
Well Construction/Drilling
Production & Completions Engineering
Unconventional Resources
Integrated - Heavy Oil
Petroleum Data Management

Facilities

Gas Processing
Process Facilities
Water & Corrosion
Offshore
Pipeline
Instrumentation, Controls, & Electrical
Mechanical
Reliability Engineering
Procurement/Supply Chain Management
Refining

Operations & Maintenance

Health, Safety, Environment

Petroleum Business and Professional Development

Petroleum Professional Development
Petroleum Business
Project Management

SIGN UP FOR PETROSKILLS EMAILS