The Course Progression Matrix below shows how the Geophysics courses in this section are structured within each topic, from Basic to Specialized. On either side of the Geophysics 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.

The first two courses in this section, Basic Geophysics – BGP and Seismic Interpretation – SI1, are two of our most popular and build the foundation of the discipline. For unconventional plays, be sure to check out Use of Full Azimuth Seismic and Microseismic for Unconventional Plays – FAMS on page 4. Also, be sure to take a look at our new course, Advanced Practices in Exploration and Development of Unconventional Resources – EDUR, on page 3.

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

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Course</th>
</tr>
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<tbody>
<tr>
<td>Mr. Peter Bartok</td>
<td>Basic Geophysics (BGP)</td>
</tr>
<tr>
<td>Mr. Bob Brune</td>
<td>Advanced Geophysics (AGP)</td>
</tr>
<tr>
<td>Mr. Satinder Chopra</td>
<td>Specialized Geophysics (SGP)</td>
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The Course Progression Matrix

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<thead>
<tr>
<th>Geology</th>
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<th>Petrophysics</th>
<th>Reservoir, Production and Drilling</th>
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<td>3D Seismic Attributes for Reservoir Characterization (Page 6)</td>
<td>Advanced Seismic Stratigraphy (Page 4)</td>
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<tr>
<td></td>
<td>Applied Seismic Analysis for Fractured Reservoir Characterization (Page 4)</td>
<td>Use of Full Azimuth Seismic and Microseismic for Unconventional Plays (Page 4)</td>
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<td>Advanced Practices in Exploration and Development of Unconventional Resources (Page 7)</td>
<td>Reservoir Characterization (Page 8)</td>
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<td>Seismic Imaging of Subsurface Geology (Page 7)</td>
<td>Seismic Velocity and Depth Conversion (Page 7)</td>
<td>Well Log Interpretation (Page 7)</td>
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<td></td>
<td>Seismic velocities and depth conversion (Page 7)</td>
<td>Seismic Acquisition Technology (Page 7)</td>
<td>Foundations of Petrophysics (Virtual/Blended, often available)</td>
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<td></td>
<td>Production Geology for Other Disciplines (Page 7)</td>
<td>Seismic Positioning Data Management (Page 7)</td>
<td>Production Technology for Other Disciplines (Virtual/Blended, often available)</td>
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<td>Seismic Interpretation (Page 7)</td>
<td>Seismic Interpretation (Page 7)</td>
<td>Mapping Surface Structures (Page 6)</td>
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<td>Evaluating and Developing Shale Resources (Page 6)</td>
<td>Geological and Geophysical Characterization of Heavy Oil Reservoirs (Page 6)</td>
<td>Basic Geophysics (Page 5) (Virtual/Blended, often available)</td>
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<tr>
<td></td>
<td>Basic Petroleum Technology (Page 5)</td>
<td>Basic Petroleum Technology Principles (Page 5) (Virtual/Blended, course)</td>
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Seismic Interpretation – SI1

FOUNDATION 5-Day

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

2019 Schedule and Tuition (USD)

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<td>Kuala Lumpur, MYS</td>
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<tr>
<td>London, UK</td>
<td>18-22 Nov</td>
<td>$5035+VAT</td>
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Basic Geophysics – BGP

BASIC 5-Day

This course is designed to familiarize anyone using seismic data with the nature of the data and what they specifically represent. 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 supported 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 thumb drive that contains the case histories, class exercises, and all of the extensive PowerPoint animations used in the classroom.

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 two- and three-dimensional seismic images
• The limits of vertical and horizontal resolution inherent in the seismic data
• How seismic data are used to measure reservoir parameters and how data guide 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 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 wavetime 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
• Core 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

Seismic Acquisition Technology in a Regulatory Era – SATR

FOUNDATION 5-Day

Around the world, we are in an age of increasingly more stringent challenges for seismic acquisition to meet regulatory requirements. Meanwhile, the acquisition of geophysical data has become increasingly more diverse, with a broad range of operational practices and technologies utilized. Regulatory and environmental issues are assuming a key driving role in seismic source design, in source strength, in footprint/impact of surveys and other ways. To meet evolving requirements, creative new technologies and practices will be needed. There are a number of highlights in current seismic acquisition technology trends.

This course provides the broad technical background for these highlights, and for the creative design of surveys to proactively address regulatory and environmental requirements. Participants are encouraged to bring along information and questions regarding any special or unusual surveys from their experience.

DESIGNED FOR
Geophysicists who work in seismic acquisition, seismic interpreters, seismic processors, engineers with involvement/interest in seismic surveys, and the full scope of E&P staff with interest in seismic acquisition and HSE issues.

YOU WILL LEARN HOW TO
• Describe technology concepts behind the full scope of different types of surveys acquired today
• Recognize the many interwoven technical and operational factors in successfully designing and executing surveys, with an emphasis on the diversity and limitations of technologies used
• Understand commercial, regulatory, and environmental issues, allowing participants to undertake an advocacy role in dealing with these increasingly more important issues
• Understand the many choices and risk factors that come into play while successfully acquiring data of optimal value for E&P

COURSE CONTENT
• Understand commercial, regulatory, and environmental issues
• Assess and appreciate the sensitivity of data processing parameters on final images
• Estimate the vertical and lateral resolution of the processing and attribute products
• Understand and examine data acquisition and processing quality control displays
• Ask appropriate questions during data processing steps
• Communicate effectively with specialists in seismic data acquisition, processing, and interpretation
• Appreciate and evaluate the trade-offs between costs, turn-around time, and sophistication of processing and imaging steps

Seismic Imaging of Subsurface Geology – SSD

FOUNDATION 5-Day

Basic seismic imaging principles and techniques are introduced at the outset of the class to establish the purpose, underlying principles, parameterization, and limitations of the various processing steps leading to final seismic images provided by current state-of-the-art imaging techniques. The course focuses on 3D seismic data. By the end of the course, the participant will understand how seismic acquisition and data processing steps affect seismic amplitudes to assess their validity as input to various post-imaging seismic attribute and inversion processes.

DESIGNED FOR
Seismic interpreters, geophysicists, geologists, and exploration team members who use seismic-data and need to understand the purpose and implications of the data acquisition and processing steps that lead to the final seismic images and derivative attributes. Also, the course is appropriate to early-career processing geophysicists seeking a rigorous foundation of the principles of data processing and seismic imaging.

YOU WILL LEARN HOW TO
• Assess and determine data processing flows for a variety of acquisition and reservoir scenarios
• Determine the most cost-effective imaging or migration technique given acquisition and structural scenarios
• Recognize various noises and how best to mitigate them
• Assess and appreciate the sensitivity of data processing parameters on final images
• Estimate the vertical and lateral resolution of the processing and attribute products
• Understand and examine data acquisition and processing quality control displays
• Ask appropriate questions during data processing steps
• Communicate effectively with specialists in seismic data acquisition, processing, and interpretation
• Appreciate and evaluate the trade-offs between costs, time, and sophistication of processing and imaging steps

COURSE CONTENT
• Review of basics of reflection seismology: wave propagation and seismic amplitudes
• Seismic imaging techniques and principles
• Overview of 3D seismic data acquisition and quality control
• Improving seismic resolution: deconvolution, inverse-Q filtering, and spectral whitening
• Velocity estimation, velocity field building, and velocity uncertainty implications
• Near-surface problems and solutions: seismic datums and static corrections
• Noise identification and suppression: coherent noises, multiples, linear noises, and incoherent noises
• Advanced seismic imaging techniques: pre-stack time and pre-stack depth migration
• Migration velocity analysis techniques

2019 Schedule and Tuition (USD)

See website for dates and locations.

2019 Schedule and Tuition (USD)

PETROSKILLS.COM/BLENDED-BGP

BGP is also available as a virtual course which is an enhanced version of the face-to-face public session.

23 APR - 19 JUN $4325
18 JUN - 14 AUG $4325
10 SEP - 6 NOV $4325

All classes available at your location. Contact us today. +1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)
## Geophysics 3

### Advanced Practices in Exploration and Development of Unconventional Resources – EDUR

**FOUNDATION**

This course will teach you how to use velocity information and structural inputs to build a consistent velocity model and/or calibrate one that has been created during seismic data processing. This class is designed for the interpreter so that he or she understands the theory and practice of how to estimate depths from older time-migrated data, as well as how to quality control (QC) and calibrate newer PSTM data. Also covered in this class are methods to reprocess the data and how to communicate with the processor in order to produce the best velocity model and depth image.

**DESIGNED FOR**

Early-career geoscientists and engineers, especially seismic interpreters, and anyone who needs to understand the basic theory and procedures for creating velocity model and converting seismic data from time to depth. This is a foundation level course. It is neither designed nor paced for the experienced velocity modeler or processor.

**YOU WILL LEARN HOW TO**

- Understand the various types of velocities, their calculation, and the validity of their interpretation and extrapolation
- Compare, quality control, smooth, and combine the various velocity types into an integrated velocity model
- Validate model quality by examining the changes in velocity needed to tie the seismic to the well data
- Use the model to convert horizons, faults, and seismic data from time to depth
- Understand and develop an introductory level, how velocity models are used for other studies such as forward modeling and pore-pressure prediction

### COURSE CONTENT

**Velocity**

Definition and comparison of the major types of velocity including average, interval, RMS, stacking, migration, P-wave, and S-wave

**Velocity Inputs**

Accuracy and regional extent of each, including shot shots, VSQs, sonic logs, depth/time/depth functions, well picks and pseudo velocities, seismic velocities, and horizons for structural control

**Synthetic Seismograms**

Creation, upscale, and tie to seismic data.

Advanced synthetics including synthetic gather creation, Zoeppritz equations, AIP, and AVO

**Matching Synthetics to Seismic**

Calibrating the seismic data to the well data

**Seismic Velocities**

Indeed classification, mineralogy, physical and chemical attributes

**Determination of porosity, permeability, and water saturation in unconventional reservoirs**

**Biostatigraphy**

Sequence stratigraphy, and anoma in unconventional reservoirs

**Petrophysical and geophysical techniques in unconventional reservoirs**

**Rock physics and brittleness**

**Geochemistry**

Kerogen typing, thermal effects, and reserve estimation

**Physical parameters**

Affecting unconventional resources: capillary forces, pressure, seal capacity, etc.

Using global and regional stress maps

**Application of the Mohr Circle**

**Determination of frac gradients**

**Leak-Off Test (Minifrac) and microseismic**

**Water disposal and aquifer contamination**

**Economic evaluation of unconventional resources**

**Volumetric assessment considering free and adsorbed gas**

**Risk assessment, common risk segment (CRS) analysis**

### 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 with a clear and usable 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**

Geoscientists, engineers, 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**

**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**

### 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 formation, well-established geological and geophysical fundamentals. When properly applied, seismic stratigraphy provides a powerful tool for 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 source for its petroleum 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, their paragenesis. In this rigorous workshop, participants pragmatically apply the seismic stratigraphic method to optimizing their exploration efforts by working in teams on projects centered on various fields around the world. Areas for the projects include borehole-constrained seismic data drawn from various regions such 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 elastic and cationic depositional systems and sequences in three-dimensions
- Apply seismic markers and seismic attributes
- Understand and apply the various techniques available to seismic interpreters

### COURSE CONTENT

**Introduction: philosophy and history**

**Earthquake-motion and interpretation**

**Chronostratigraphy construction and interpretation**

**Sea level curves, accommodation space, and cycle order**

**Vail sequence theory and sequence hierarchy**

**Carbonate sequences**

**Seismic facies**

**Paleo-environmental analysis**

**Geohistory reconstruction**

**Optimizing exploration**

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### 2019 Schedule and Tuition (USD)

<table>
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<th>Location</th>
<th>Tuition</th>
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<td>DUBAI, UAE</td>
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* plus computer charge

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3D Seismic Attributes for Reservoir Characterization – SARC

SPECIALIZED 5-Day

The primary objective of this course is to gain an intuitive understanding of the kinds of seismic features that can be identified by 3D seismic attributes; the sensitivity of seismic attributes to seismic acquisition and processing, and how independent seismic attributes are coupled through geology. We will also discuss alternative workflows using seismic attributes for reservoir characterization as implemented by modern commercial software and practiced by interpretation service companies. Participant discussion centered around case studies, attribute recipes for particular objectives, reservoir workflows and seismic attribute jealousy exercises will be the main focus of the course.

DESIGNED FOR

Seismic interpreters, processors, stratigraphers and structural geologists, reservoir engineers, and students of geophysics.

YOU WILL LEARN HOW TO

• Use attributes to enhance subtle faults and folds, as lithologic indicators, and quality control the choice of processing parameters
• Evaluate and exploit attribute expressions for different depositional environments to better characterize reservoirs by adopting appropriate workflows and multi-attribute tools
• Identify geological features highlighted by attributes, limitations to seismic processing through attributes that may result in smeared attribute images from multi-azimuth and multi-offset data, limits of attribute analysis on data that have been poorly imaged and good and bad color display practices

COURSE CONTENT

Types of attributes • Impact of seismic data quality on seismic attributes • Methods for preconditioning of seismic data • Introduction of various algorithms for attribute computation, their limitations and performance strengths • Attribute expression of structure and stratigraphy in terms of facies and diagenesis, clastic and carbonate depositional systems and geologic hazards • Multi-attribute analysis tools • Reservoir characterization workflows • Physical demonstration of attributes on real seismic data

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

SPECIALIZED 5-Day

Seismic stratigraphy is a powerful tool for exploration and exploitation. 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 will learn how to make seismic modeling-interpretation judgments as a basis for seismic-facies and reflection characterization 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 Scales 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 strength and weaknesses of geovisualization using and misusing synthetic, 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 and when to optimally employ them
• Develop a 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 paraconformity sets
• Interpret clastic and carbonate depositional system responses to all Phaneretic and Phaneritic processes and the effects upon reservoir architecture and seal potential
• Optimally interpret paraconformity set fairways for exploration
• Geologically characterize reservoirs for optimizing development

COURSE CONTENT

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

Applied Seismic Anisotropy for Fractured Reservoir Characterization – ASAP

SPECIALIZED 5-Day

This course is designed to enable you to perform professional geophysical work to evaluate fractured reservoirs and/or reservoirs that require hydraulic fracturing to produce. The emphasis of the lectures is strongly upon the participants work assignments. Field data case histories and laboratory data illustrate the principles and practices of calibrating azimuthal travel times and azimuthal prestack amplitudes against independent measurements of in-situ horizontal stresses, and natural fractures that flow fluids. The course covers acquisition design and Q/C, azimuthal processing, interpretation, and modeling to test different interpretations. The skills that you will learn also involve integrating the support data - well logs, production testing, VSP, core work - with your reflection seismic data. This includes identifying the effects of the two types of seismic anisotropy on seismic data. You will learn how to employ anisotropy to accomplish your reservoir-related goals. Seismic anisotropy is everywhere in the layered sedimentary rocks, but in the past, geophysicists have often ignored it, sometimes because they didn’t control the data that reveal its presence, and other times because they didn’t understand the benefits that properly recorded and processed anisotropically data provide. The class is usually designed as lectures in the morning, with field-data analysis in the afternoon. If the course is taught as an in-house course, with your own properly acquired and properly processed 3D data, then software applications useful for fractured reservoir analysis will be used during the class.

DESIGNED FOR

Working, interpretation geophysicists and other geoscientists assigned to evaluate fractured reservoirs or reservoirs requiring hydrofracturing to produce.

YOU WILL LEARN HOW TO

• Ask necessary geotechnical questions about your reservoir and play, identify the geophysical data needed to answer those questions; design acquisition and processing procedures; qualify-check during processing; interpret the final processed data; model different interpretations.
• Identify the support data required for successful fracture / in-situ stress analysis. Recognize seismic anisotropy, its causes, and what happens to projects that ignore ubiquitous anisotropy. Identify the two types of seismic anisotropy, and how each appears in seismic data.
• Use anisotropy for your benefit. Classic analysis of azimuthal anisotropy requires seismic reflectors, that is, your reservoir must be within a sedimentary rock sequence. If your reservoir is in fractured basement rocks, you will learn practical techniques to evaluate the reservoir and guide the drilling program.
• Bring your properly acquired and recorded dataset(s) - they could demonstrate the principals of the morning lectures.

COURSE CONTENT

Fundamentals of reflection seismology: seismic anisotropy - its causes and uses • Issues, goals, and pitfalls in seismic full-azimuth acquisition • Seismic data processing - nonazimuthal and azimuthal • Interpretation of azimuthal interval velocities and azimuthal amplitudes for in-situ stress and natural fractures evaluation • Fundamentals of seismic modeling for anisotropy, especially common assumptions in different modeling packages • Microseismic: opening statements and discussion, Historical background, Yeoman science 101 • Hydraulic fracture technology, In-situ and other studies of hydraulic fracture geometries • Earthquake seismology and hydraulic-fracture-induced microseismology • The means and the methods of microseismic imaging • Examples 1: results - the dots • Examples 2: interpretation and integration • Pitfalls, benefits, FAQs • Wrap-up discussion

Use of Full Azimuth Seismic and Microseismic for Unconventional Plays – FAMS

SPECIALIZED 5-Day

For surface seismic, participants will learn to evaluate azimuthal seismic in fractured reservoirs or resource intervals needing hydraulic fracturing. The course presents reflection seismology and 3D seismic acquisition-design, processing, interpretation, and integrating support data narrow-azimuth seismic, well logs, production tests, VSPs, and core work. For microseismic, participants will learn the strengths, weaknesses, limitations, and benefits of microseismic imaging of hydraulic fractures.

DESIGNED FOR

For surface seismic, experienced geoscientists working seismic to evaluate unconventional resources, and/or fractured reservoirs that require hydraulic stimulation. For microseismic, all professionals using microseismictly to plan, monitor, evaluate, and diagnose stimulations will find this course useful.

YOU WILL LEARN HOW TO

• Specify what geology and/or engineering questions need to be asked about your reservoir and your play
• Specify the geophysical data that need to be acquired; design acquisition; specify the processing sequence
• Interpret the final processed data and test different interpretations
• Identify the support data required for the successful fracture and in-situ horizontal stress characterization
• Extract engineering benefits and meaning from microseismic data
• Appraise the utilities, capabilities, and limitations of microseismic imaging
• Develop insights and fundamental questions for microseismic projects
• Identify the support data needed to give a complete picture of the results
• Weigh field deployment options
• Assess stimulation designs

COURSE CONTENT

Fundamentals of reflection seismology: seismic anisotropy - its causes and uses • Issues, goals, and pitfalls in seismic full-azimuth acquisition • Seismic data processing - nonazimuthal and azimuthal • Interpretation of azimuthal interval velocities and azimuthal amplitudes for in-situ stress and natural fractures evaluation • Fundamentals of seismic modeling for anisotropy, especially common assumptions in different modeling packages • Microseismic: opening statements and discussion, Historical background, Yeoman science 101 • Hydraulic fracture technology, In-situ and other studies of hydraulic fracture geometries • Earthquake seismology and hydraulic-fracture-induced microseismology • The means and the methods of microseismic imaging • Examples 1: results - the dots • Examples 2: interpretation and integration • Pitfalls, benefits, FAQs • Wrap-up discussion

2019 Schedule and Tuition (USD)

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Introduction to Data Management – IDM

BASIC 2-Day

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

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

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

 coursework 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

Seismic Positioning Data Management - SPDM

FOUNDATION 2-Day

While both seismic navigation and trace data topics are covered, there is a greater focus on the geospatial component of trace data, with respect to navigation and positioning. The course will offer insight into the operational considerations to ensure removal of geo-spatial data ambiguity using case studies of data acquisition, processing, data loading, and proposed well location selection. Preservation of metadata and compliance to international standards in data exchange will provide the interface backbone to enhancing data quality and removing any ambiguity with respect to georeferencing and legal ownership. Ensuring interpreters interpret and are not deviated from their activities by having to resolve mis-ties within the data is key to enhancing efficiency at a critical stage of the project cycle.

DESIGNED FOR

This course is aimed at a wide audience and will be of particular benefit to technicians, data loaders, and data analysts. Those involved with seismic data processing can preserve data quality and obtain geo-spatially accurate imaging of subsurface features by applying techniques covered in the course. Asset team members responsible for maintaining seismic data and data loading to interpretation workstations can enhance their processes by applying techniques covered.

YOU WILL LEARN HOW TO

• Assess data quality and manage seismic trace and navigation data related to seismic data acquisition, processing and data loading
• Apply best practices to enhance and preserve data integrity and ensure seismic data sets are fit for purpose and robust and contain geophysically significant errors
• Preserve metadata and maintain compliance with international standards for data exchange

 COURSE CONTENT

Seismic navigation data principles • Basic geodesy • 2D data loading exercises • Data quality control and practical examples thereof • 2D data editing and exporting • 3D bin grid data definitions and exercises for importing, analyzing, editing, and exporting • Applied geodesy introduction to EPGS database • Trace data Licensing • Acquisition • Storage • Import and quality assessment • Formats and conversions • Best practices

Basic Petroleum Technology Principles – BPT

BASIC 20 HOURS

This course provides the participant with an understanding of basic petroleum technology in the context of the Petroleum Value Chain, from exploration to abandonment. The participant will understand how and when geoscience and engineering professionals use technology to find, then determine and optimize the economic value of an oil and gas field. This enables the participant to maximize their professional and administrative contribution in their organization.

DESIGNED FOR

Those who need to achieve a context and understanding of E&P technologies, and the role of technical departments in oil and gas operations. An understanding and use of oilfield terminology is developed.

YOU WILL LEARN

• Historical petroleum occurrences and usage
• The objectives and processes of the exploration phase of the E&P asset life cycle
• The objectives, processes, and economic metrics of the appraisal phase of the E&P asset life cycle
• The relationship between depositional environments and geologic settings
• Exploration concepts
• Elements of a successful petroleum system
• Key differences between unconventional and conventional petroleum systems
• The Earth’s structure, continental drift, and plate tectonics role in oil and gas development
• Rock types and classification in an oil and gas context
• The relationship between depositional environments and geologic settings

 COURSE CONTENT

E&P Industry and asset life cycle • Petroleum geology • The Earth’s structure, continental drift, and plate tectonics role in oil and gas exploration • Rock types and classification in an oil and gas context • Evolution of sedimentary environments • Petroleum geology for exploration and production • The relationship between depositional environments and geological settings

Basic Petroleum Technology – BPT

BASIC 5-Day

This course provides the participant with an understanding of basic petroleum technology in the context of the Petroleum Value Chain and Asset Management, from exploration to abandonment. Unconventional shale (light oil and gas) and conventional oil and gas are covered. The participant will understand how and when geoscience and engineering professionals use technology to find, then determine and optimize the economic value of an oil and gas field. This enables the participant to maximize their professional and administrative contribution in their organization. Participants first learn and understand why various global oil and gas production types and plays (unconventional and conventional) have different value. The participant learns which technologies are used by the geoscience and engineering departments during each stage of the asset life cycle and Why! This E&P lifecycle context accelerates an understanding of basic petroleum technologies and the oil industry. This learning is achieved through guided discussions, videos, animations, and progressive team exercises utilizing ‘Our Reservoir’ and ‘Our Well’ as working models.

DESIGNED FOR

This course is appropriate for those who need to achieve a context and understanding of E&P technologies in conventional and unconventional fields, and/or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

YOU WILL LEARN

• The E&P Process and how it differs in conventional vs unconventional plays, the role of each technical department and specialist, and the technologies used
• The economic value and properties of reservoir fluids
• Petroleum geology for exploration and production
• About oil and gas reservoirs, both conventional and unconventional, and understand the key differences
• Exploration and appraisal technologies
• Drilling operations for exploration, development and production
• Production - well completions and production technology
• Reservoir recovery mechanisms through primary, secondary, and tertiary recovery
• Surface processing of produced fluids

 COURSE CONTENT

World hydrocarbon production and consumption review including reserves, benchmarks, and the impact of shale resources • Reservoir fluid properties • Petroleum geology • The petroleum reservoir, conventional and unconventional • Exploration technologies for conventional and unconventional reservoirs including initial reserve estimates and subsequent field development • Drilling and operations • Well completions and workovers • Production operations • Reservoir recovery mechanisms • Surface processing

Self-paced, virtual course

- start anytime.

FOR MORE INFORMATION, VISIT PETROSKILLS.COM/BPTONLINE

2019 Schedule and Tuition (USD)

+ plus computer charge

Houston, US

10-11 June

$2595

HOUSTON, US

11-15 March

$4225

22-26 March

$4225

7-11 Oct

$4225

Kuala Lumpur, MYS

18-22 Nov

$5120

London, UK

3-7 June

$4985+vat

4-8 Nov

$4985+vat

New Orleans, US

6-10 May

$4170

See website for dates and locations.

2018 Schedule and Tuition (USD)

HOUSTON, US

7-11 Oct

$4225

20-24 Nov

$4225

KUALA LUMPUR, MYS

18-22 Nov

$5120

LONDON, UK

3-7 June

$4985+vat

4-8 Nov

$4985+vat

NEW ORLEANS, US

6-10 May

$4170

PetroAcademy
Basic Petroleum Geology - BG

5-Day

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.

Course Content
- Current shale plays and their global impact
  - Reservoir characterization and evaluation: 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: strategies for implementing a 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

Geological and Geophysical Characterization of Heavy Oil Reservoirs - HORC

3-Day

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. Economic 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 reserves is therefore at the heart of production of this resource.

Course Content
- Determination of reservoir properties and sedimentary facies
- Identification of reservoir traps
- 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
- Elements 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 geophysicists and exploration
- How geology bears directly on engineering practices

Course Content
- 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
- 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 geophysicists and exploration
- How geology bears directly on engineering practices
Production Geology for Other Disciplines – PGD

**FOUNDATION**

5-Day

Have you ever wondered why it seems like Geologists rarely give you a straight answer? Are there never-ending qualifiers tucked 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. Without a common understanding between geologists and engineers, there can be no real communication or teamwork in reservoir development and production activities.

**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 need a basic 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 stated for production or 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 geological interpretation
- 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 cons can

**COURSE CONTENT**

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

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**Basin Analysis Workshop: An Integrated Approach – BA**

**INTERMEDIATE**

5-Day

Basin analysis, whether for conventional or unconventional resource play analysis, demands an integrated approach from explorationists. It is both inappropriate and misleading to suggest that the tectonic-thermal-sedimentologic framework of any one basin is an established fact, or even that all basins submit to the same simple and equivocal models. Therefore, this five-day course does not passively present an inventory of basins of the world. Instead, this workshop provides the theory, methods, and active practice for participants to develop and optimize their own individual basin evaluation and modeling modus operandi. Incorporated as practical problems for workshop analysis and subsequent discussion are case histories and new findings from throughout the world utilizing geologic, geophysical, and geochronological data sets. In addition, students construct and interpret their own 1D and 2D basin models using BASINMOD, an industry standard of basin modeling software.

**DESIGNED FOR**

Geoscientists, especially those in New Ventures or in Asset Evaluation, who require a non-superficial but practical application of an integrated variety of state-of-the-art geological/geophysical/geochronological tools for the regional to local evaluation of conventional and unconventional resources plays in sedimentary basins.

**YOU WILL LEARN HOW TO**

- Systematically assess the evolution of a basin’s conventional and unconventional petroleum system criticals through space and time through a practical application of geology, geophysics, and geochronology
- Evaluate the geomorphological and geomechanical fundamentals controlling a basin’s burial history through tectonic subsidence analysis
- Relate organic source quantity and quality to sedimentary processes and environments
- Delineate migration pathways through space and time
- Evaluate seal/trap quality
- Geovariable the kinetic model
- Rank and quantify petroleum system risk both deterministically and stochastically using Monte Carlo methods
- Determine within a basin the optimal stratigraphic and spatial locations for exploring conventional and unconventional resource plays
- Work in an integrative team to generate and present a prospect from the team’s own crafted 2D basin model from both well control and seismic generated virtual wells
- and more...

**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 assessment workshop: projects supplied either by the instructor or by participants, worked by teams and reported to the entire group • Aggregate of assessment results: summarizing, densifying, 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

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**Prospect and Play Assessment – PPA**

**INTERMEDIATE**

5-Day

This fully revised and updated course is a fully modern approach to defining prospect and play volumes, 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, geochromists, 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 use 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

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**Basic Drilling Technology – BDT**

**BASIC**

5-Day

FIELD TRIP

This 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 regardless of academic background. The overall drilling process is presented along with definitions and descriptions of drilling equipment. This provides the vocabulary to understand the drilling process. 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, stick 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 drilling include mathematical explanations for those involved with the engineering aspects of drilling operations; however, the concepts and intent of these mathematical equations will 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 avoiding them
- How to read a morning report
- Technology behind info in a morning report

**COURSE CONTENT**

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 (stick pipe, lost circulation) • Well control • Directional drilling operations and tools • Safety

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**2019 Schedule and Tuition (USD)**

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* plus computer charge

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* plus computer charge

† includes field trip

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**Foundations of Petrophysics** – FPP

**FOUNDATION 5-Day**

Petrophysics is fundamental to all aspects of the petroleum business. Principles, applications, and integration of petrophysical information for reservoir description will be discussed in detail. Through a combination of class discussion and exercises/workshops, participants will learn how to conduct complete 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 a basic level of 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 TWD/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 and Logging objectives • Invasion profile • Challenge of borehole geophysics • Passive electrical properties of earth materials • Highlight oil mobility • Interpret pressure profiles • Develop optimum tools and logging programs • Apply quick-look methods of formation evaluation

**Foundation of Petrophysics**

**Well Log Interpretation – WLI**

**FOUNDATION 5-Day**

The most universal, comprehensive, and concise descriptive documents on oil and gas wells are logs. They impact the work of almost every oilfield geologist from geologists to roundtable 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 reconnaisance 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 • Highlight oil mobility • Interpret pressure profiles • Develop optimum tools and logging programs • Apply quick-look methods of formation evaluation

**Well Log Interpretation – WLI**

**Applied Rock Mechanics – ARM**

**SPECIALIZED 3-Day**

Understanding the stress, strain, and failure mechanics of rocks and their response to earth stresses can lead to enormous economic benefits in all phases of petroleum reservoir development. Over the last ten years, rock mechanics has emerged as a critical technology capable of lowering financial risk in drilling and well completions, qualifying exploration and development opportunities, and improving hydrocarbon productivity. Rock mechanics is a vital decision-making tool for high-angle and horizontal drilling, unconventional reservoirs, deepwater drilling, massive hydraulic fracturing, and completing poorly cemented formations. Borehole instability, casing shear, subsidence, stuck pipe, and sand control issues cost the petroleum industry many billions of dollars annually. New theory and experimental methods as well as straightforward computer modelling techniques have provided insight into developing prospects in complex geological basins and harsh drilling environments. In Applied Rock Mechanics, students are provided with basic theory, laboratory demonstrations, hands-on exercises, and computer modeling demonstrations. In addition to a comprehensive manual, software is provided for the student to perform wellbore stability calculations. The practical application of rock mechanics is emphasized. Applied Rock Mechanics is designed to familiarize engineers and geoscientists with the necessary tools for immediate field application.

**DESIGNED FOR**

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

**YOU WILL LEARN HOW TO**

- Determine the stress, strain, and failure mechanics of rocks
- Apply rock mechanics concepts and generate economic benefits in all phases of reservoir development

**COURSE CONTENT**

Introduction to rock mechanics and geomechanical principles • Basic mechanics • Rock mechanical properties • Pressure, stresses, and loads • Geomechanics and structural geology • Wellbore and field measurement of in-situ (earth) stresses • Overview of common rock mechanics tests (lab demonstration) • Stress orientation techniques • Elastic, plastic, and viscous models of rock behavior • Borehole stability • Sand control • Fracture mechanics • Unconventional reservoir applications • Reservoir engineering applications • Wireline logged petrophysical data • Data integration

**Basic Reservoir Engineering** – BR

**BASIC 5-Day**

This course is 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.

**DESIGNED FOR**

Geologists, geophysicists, engineers, engineering trainees, technical managers, technical assistants, technicians, chemists, physiologists, 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 that want a first reservoir engineering course at the Basic level.

**YOU WILL LEARN**

- How to collect and analyze the data needed for reservoir engineering tasks
- 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

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**Virtual Delivery $4325**

**PETROSKILLS.COM/BR-BLENDED**

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**2019 Schedule and Tuition (USD)**

**2019 Schedule and Tuition (USD)**

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**2019 Schedule and Tuition (USD)**

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Reservoir Characterization: A Multi-Disciplinary Team Approach – RC

INTERMEDIATE 5-Day

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.

The course is process-based and focuses upon understanding the applicability of measurements and interpretations from the participant’s discipline to other adjacent disciplines, understanding information from other disciplines, and the uncertainties and risks involved in its gathering/interpretation, awareness of the latest technologies and working principles evolving on the cutting edge of the industry, managing a complex project to solve business problems in the most efficient manner, particularly when working in a difficult environment (multi-disciplinary teams, sponsors and bosses outside your expertise), cross purposes from disciplines, and working with both probabilistic and deterministic multiple working hypotheses throughout a hydrocarbon project.

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

• To develop a business proposal for any Reservoir Characterization project
• To apply the concept of correlation length to understand reservoir connectivity
• To define hydraulic flow units in a reservoir
• To assess the economics of oil and gas projects across their entire life cycle
• To carry out the integrated Reservoir Characterization process

COURSE CONTENT

Business value drivers and selection criteria • Time and flow units • Source rock and accumulation • Reservoir simulation • Design, data, and value of information • Giving and receiving feedback • The future of Reservoir Characterization

Production Technology for Other Disciplines – PTO

FOUNDATION 5-Day

PTO is an asset team course, as it introduces a broad array of important daily Production Technology practices. Terminologies, expressions, axioms, and basic calculations regularly utilized by production techs are covered. Emphasis is upon proven technology required to effectively develop and operate an asset in a multidisciplinary development environment. Practical application of technology is emphasized. Nodal analysis examples to assess well performance are set up. Well completion equipment and tools are viewed and discussed. Exercises include, 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 sand control gravel pack completions
• Evaluate candidate selection to conduct a hydraulic fracturing campaign
• Apply new production technology advances for smart well completions
• Maximize asset team interaction and understand the dynamics between production technology and other disciplines

COURSE CONTENT

Role and basis of production technology • Completion design • Flow and inflow performance • Artificial lift well completion systems • System pump, gas-lift, ESP, PCP, plunger lift • Formation damage and well acidizing • Perforating practices • Sand control • Hydraulic fracturing • Shale gas and oil development • and more...

You can also consult the PetroSkills course overview for a more detailed description of the course. The course is structured to provide a comprehensive understanding of production technology fundamentals and practical applications that are essential for successful asset management.

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.

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 affecting 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

You will learn how to forecast oil production, define reserves, and apply economic criteria to choose investments. The course will cover the fundamentals of basic probability and statistics, including probability distributions and popular statistics. You will learn how to evaluate the economic viability of a project using cash flow techniques and economic criteria. You will also learn how to choose investments based on risk and uncertainty.

Petroleum Risk and Decision Analysis – PRD

FOUNDATION 5-Day

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, and then apply these 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. Mathematics is straightforward and mostly involves only common algebra. 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 analytic 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 (a key problem type emphasized in the course), 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 elicitation, 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) • and more...

You will learn how to model the decision analysis process and solve decision problems using Monte Carlo simulation and decision tree analysis. The course will cover the fundamentals of basic probability and statistics, including probability distributions and popular statistics. You will learn how to model decision trees and implement decision analysis using computer tools. You will also learn how to evaluate decision options using various decision models and techniques.
Petroleum Project Management: Principles and Practices – PPM

INTERMEDIATE 5-Day

Successful petroleum operations need a blend of technology, business savvy, and people skills. If you have a firm grasp of exploration or production technology, boost its impact by applying project management techniques. Running a staged program that integrates reservoir modelling, production estimating, drilling, and facility design is challenging. The tools and techniques covered in this course will help you meet that challenge. Upon completion you will know how to make better decisions in field development that lead to high value and low cost; develop integrated plans to run the overall program; and develop key deliverables for each stage of development to reduce uncertainty.

Instruction, guided discussions and in-depth work tasks are used. You may choose a case study from several real-life situations that are based on the instructor’s petroleum experience. Or you may bring the details of one of your own current programs.

DESIGNED FOR

Exploration and production personnel with a background in geoscience, petrochemical engineering or drilling should attend. If you are a facilities engineer, we refer you to our Project Management for Engineering and Construction (FPMEC) and Project Management for Upstream Field Development (FPMD) courses.

YOU WILL LEARN HOW TO

• Navigate the staged development process
• Manage the interfaces among exploration, drilling and facility groups
• Properly define a scope of work
• Create a realistic, integrated schedule
• Find and reduce petroleum development risks
• Develop a high-performance team
• Capture lessons learned

COURSE CONTENT

The staged development process • Scope definition • Scheduling tools • Manpower resources • Forecasting and mitigating risks • Learning, continuous improvement, and quality control • Project team management • Petroleum case studies and exercises

Essential Leadership Skills for Technical Professionals – OM23

BASIC 5-Day

In the oil and gas industry, skillful and competent leadership is extremely important for safety, productivity, and asset management. The 21st century brings new emphasis on leaders, new communication technologies, increased focus on safety, information overload, workforce dynamics, asset integrity, and many other concerns which challenge even the most proficient leader-manager. How do we blend these new challenges with tried and true wisdom of success? There are skills to learn that will help you to be more effective, with less stress. In this seminar/workshop you will explore your internal drivers and learn how to combine them with new skills for greater effectiveness. This seminar/workshop will include self-assessment, discussion, lecture, readings, role-playing, games, video examples, and creation of participant action plans. This course will help you unleash natural motivation in your team. Your stress level can be lowered by working more efficiently and effectively by tapping the emotional intelligence of your team and co-workers.

DESIGNED FOR

Anyone who has new responsibilities to lead a team. Supervisors, team leads, managers, and others interested in becoming a better leader and a contributing team member will greatly benefit from this one-week experience. Many may want to take this seminar/workshop more than once for continuous improvement.

YOU WILL LEARN HOW TO

• Become a more effective leader by overcoming the “tyranny of the urgent” with better time management
• Make better decisions by assessing when to make what kind of decisions
• Help others develop themselves by unleashing their career motivation
• Have more effective communications with technical and non-technical teams by developing the patience to let the team do its work
• Recognize and resolve conflicts before they get out of control by early detection of conflicts, when they’re simpler and have less impact
• Develop the ability to lead an empowered team of technical professionals by more effective delegation
• Reduce your own stress level by teaching yourself how to lower your stress with clearer thinking
• Learn assessment techniques for yours and other’s people skills by raising the competency levels of yourself and your team
• Walk your talk by getting buy-in for your ideas and vision
• Leading by example

COURSE CONTENT

The nature of teams • Leadership vs. management • Self-centering and tangential leadership • Listening • Motivation • Group dynamics • Conflict management • Team-building • Critical thinking and taking action

Essential Technical Writing Skills – ETWS

BASIC 3-Day

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

• To focus on the reader as the receiver of the information
• To develop quality writing that will:
  • Improve business relationships and communication
  • Enable you to 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

Team Leadership – TLS

FOUNDATION 2-Day

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 2-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

2019 Schedule and Tuition (USD)

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See website for dates and locations.

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All classes available at your location. Contact us today.

+1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)
Our Participants Say It Best.

“[Course title] • [Location]”

“[Instructor’s name], the instructor, was very knowledgeable, and was effective in his demonstration of the material. He was great at providing relevant case histories and real life examples.”

- [Instructor’s name]  •  [Course title]  •  [Location]

“[Course title] • [Location]”

“The course was very interactive, engaging, and educative, especially with such an experienced instructor. He has vast knowledge in various fields in the oil industry.”

- [Instructor’s name]  •  [Course title]  •  [Location]

“[Course title] • [Location]”

“The instructor provided a holistic and comprehensive perspective to the course material. He was very engaging, and taught with clarity through demonstrations.”

- [Instructor’s name]  •  [Course title]  •  [Location]

“[Course title] • [Location]”

“I definitely improved my knowledge on the subject and systematized all the previously known unsorted information.”

- [Instructor’s name]  •  [Course title]  •  [Location]
IN-HOUSE TRAINING
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WHERE YOU NEED IT.

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**Petroleum Business and Professional Development**
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- Petroleum Business
- Project Management

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PetroSkills Blended Learning Skill Modules™ combine industry knowledge, 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

Courses Available Now:

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- Basic Drilling, Completion, and Workover Operations
- Basic Geophysics
- Basic Petroleum Technology Principles
- Basic Reservoir Engineering
- Basics of Rotating and Static Mechanical Equipment
- Casing Design Workshop
- Completions and Workovers
- Foundations of Petrophysics
- Gas Conditioning and Processing
- NODAL Analysis Workshop
- Process Safety Engineering
- Production Operations 1
- Production Technology for Other Disciplines
- Scale Identification, Remediation and Prevention Workshop

For more information, please visit petroskills.com/blended