## Petrophysics Course Progression Matrix

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

### Foundations of Petrophysics - FPP

**FOUNDATIONS**

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 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 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
- Assess the impact of petrophysical analyses on technical uncertainty estimates of reservoirs

<table>
<thead>
<tr>
<th>Course Focus</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETROPHYSICAL DATA ACQUISITION</td>
<td>Well Log Interpretation and Integration (Page 5)</td>
</tr>
<tr>
<td>OPERATIONS LOG INTERPRETATION</td>
<td>Wireline Formation Testing and Interpretation (Page 3)</td>
</tr>
<tr>
<td>DATA INTERPRETATION AND FIELD STUDIES</td>
<td>Naturally Fractured Reservoirs (Page 10)</td>
</tr>
<tr>
<td>ROCK MECHANICS</td>
<td>Capillary in Rocks (Page 4)</td>
</tr>
<tr>
<td>Cased Hole Log Analysis</td>
<td>Nuclear Magnetic Resonance (NMR) Petrophysics (Page 4)</td>
</tr>
<tr>
<td>INTERPRED INTERPRETATION</td>
<td>Shaw Saka Petrophysics (Page 4)</td>
</tr>
<tr>
<td>INTERPRETATION OF ROCKS, LOG AND TEST DATA</td>
<td>Integration of Rocks, Log and Test Data (Page 4)</td>
</tr>
<tr>
<td>STRUCTURAL AND STRATIGRAPHIC INTERPRETATION OF CUTTERS AND IMAGE-LOGGING LOGS</td>
<td>Reservoir Characterization (Page 8)</td>
</tr>
<tr>
<td>OPERATIONAL GEOLOGY (Page 8)</td>
<td>Petrophysics of Unconventional Reservoirs (Page 9)</td>
</tr>
<tr>
<td>Evaluating and Developing Shale Resources (Page 9)</td>
<td>Petrophysics of Unconventional Reservoirs (Page 9)</td>
</tr>
<tr>
<td>CARBONATE RESERVOIRS (Page 8)</td>
<td>Well Log Interpretation (Page 6)</td>
</tr>
<tr>
<td>SEDIMENTARY RESERVOIRS (Page 8)</td>
<td>Foundational Petrophysics (Progression Page) (Also available as a Virtual/Delivered course)</td>
</tr>
<tr>
<td>INTRODUCTION TO FIELDS FOR UNCONVENTIONAL RESERVOIRS</td>
<td>Reservoir Engineering for Other Disciplines (Page 10)</td>
</tr>
<tr>
<td>INTRODUCTION TO FIELDS FOR UNCONVENTIONAL RESERVOIRS</td>
<td>Production Technology for Other Disciplines (Page 10) (Also available as Virtual/Delivered course)</td>
</tr>
<tr>
<td>PRODUCTION LOGGING (Page 16)</td>
<td>Reservoir Engineering for Other Disciplines (Page 10)</td>
</tr>
</tbody>
</table>

### 2019-2020 Schedule and Tuition (USD)

- **LONDON, UK**
  - 16-20 OCT 2019: £3900
  - 28-31 OCT 2019: £4250
  - 29-31 OCT 2019: £4700
  - 16-19 MAR 2020: £4250
  - 29-31 MAR 2020: £4700
  - 2-15 SEP 2019: £4250
  - 24-26 SEP 2019: £4700
  - 2-4 DEC 2019: £5200

**VITALDELIVERY $4325**

PETROSKILLS.COM/FPPONLINE

**FPP is also available as a self-paced, virtual course which is an enhanced version of the face-to-face public session.**

All classes available at your location. Contact us today.
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 group from geologists to routeway bankers. Familiarity with the purposes and optimum applications of well logs is 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. Whereas the purpose of the physical 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, factor saturation, and hydrocarbon type for essentially clean reservoirs. Cross-plotted information and reconnoissance techniques quickly and efficiently discriminate between water, oil, and gas. 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
• Understand 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 • Mere-sensitivity logs, GR, SGR, Pm • 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 crosstabs and mineralogy identification • Partially saturated rock properties and Archie Equation • Linear movable oil plots • Reassessment techniques, Rea, PPU, logarithmic scale • Porosity-resistivity crosstabs • Permeability relationships • Nuclear magnetic resonance • Use of pressure measurements • Computerized log evaluation • Sidewall coring • Recommended logging programs

Mudlogging – MDLG

Coring and Core Analysis – CCA

FOUNDATION 5-Day
LAB VISIT
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, the 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 • Wellbore geometry, relative permeability, capillary pressure, and reservoir fluid distribution • Data integration in reservoir simulation • Final problem: design of coring and core analysis program

Introductory Geomechanics for Unconventional Reservoirs – IGUR

FOUNDATION 5-Day
NEW
This course provides an overview of petroleum geomechanics and its applications for development of unconventional plays. It is presented in three sections: (i) fundamentals of petroleum geomechanics, (ii) geomechanical characterization, stress modeling and building mechanical earth models, and (iii) geomechanical modeling for unconventional plays.

DESIGNED FOR
Geoscientists, petrophysicists, engineers, or anyone involved in unconventional reservoir development...

YOU WILL LEARN
• Essentials of rock mechanics concepts such as stress and strain tensors, rock constitutive models, and failure criteria
• To review lab-measured reports to understand mechanical rock properties and to understand the application of this data to case studies
• The key geomechanical parameters of shales (e.g., Young’s modulus, Poisson’s ratio, and fracture gradient)
• The origins of pore pressure generation and pressure prediction and measurement methods for unconventional plays
• The processes of multi-source data collection (from cores, logs, lab and field tests, drilling, seismic, microseismic, etc.) for characterization of rock properties and in-situ stresses and building Mechanical Earth Models (MEMs)
• To analyze and interpret the geomechanical aspects of image logs, mini-fracs and ERT tests, and drilling and completion reports
• To use different methodologies to measure/estimate in-situ stress components
• To apply geometric modeling to unconventional plays
• Practical approaches for drilling and mud window design
• The basic principles of hydraulic fracture design
• To characterize natural fractures and use discrete fracture network (DFN) modeling to account for their influence on hydraulic fracturing operations
• About modeling and monitoring of fault reactivation and seismicity induced by hydraulic fracturing and waste fluid disposal
• The application of data analytics and machine learning for optimization of drilling, completion, and production in unconventional plays

COURSE CONTENT
Introduction to petroleum geomechanics • Stress and strain tensors • Deformation models and failure criteria • Laboratory measurement and calculation methods • and in geomechanics • Origins of pore pressure generation and different pore pressure measurement and calculation methods

Modeling and evaluation of unconventional plays.

COURSE CONTENT
Introduction to petroleum geomechanics • Stress and strain tensors • Deformation models and failure criteria • Laboratory measurement and calculation methods • and in geomechanics • Origins of pore pressure generation and different pore pressure measurement and calculation methods

Modeling and evaluation of unconventional plays.

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABERDEEN, UK</td>
<td>24-28 FEB 2020</td>
<td></td>
<td>$5165+VAT</td>
</tr>
<tr>
<td>DENVER, US</td>
<td>31 AUG-4 SEP 2020</td>
<td></td>
<td>$4435</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>16-20 DEC 2019</td>
<td></td>
<td>$4495</td>
</tr>
<tr>
<td>KUALA LUMPUR, MYS</td>
<td>3-7 AUG 2020</td>
<td></td>
<td>$5395</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>11-15 NOV 2019</td>
<td></td>
<td>$5065+VAT</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>27-31 JULY 2020</td>
<td></td>
<td>$4985</td>
</tr>
<tr>
<td>MELBOURNE, AUS</td>
<td>28 SEP-2 OCT 2020</td>
<td></td>
<td>$4410</td>
</tr>
<tr>
<td>MELBOURNE, AUS</td>
<td>21-25 SEP 2020</td>
<td></td>
<td>$5375+GST</td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>CALGARY, CAN</td>
<td>18-22 NOV 2019</td>
<td></td>
<td>$4275+GST</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>14-18 SEP 2020</td>
<td></td>
<td>$4110</td>
</tr>
</tbody>
</table>
## Extend Learning into the Field

### 2019-2020 Courses with Field Trips

<table>
<thead>
<tr>
<th>PG</th>
<th>COURSES WITH FIELD TRIPS</th>
<th>LOCATION</th>
<th>DATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>See website</td>
<td><strong>ANALYSIS OF STRUCTURAL TRAPS IN EXTENSIONAL SETTINGS - ESS</strong></td>
<td>Las Vegas, US</td>
<td>2-6 Nov 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>BASIC DRILLING TECHNOLOGY - BDT</strong></td>
<td>Houston, US</td>
<td>16-20 Dec 2019</td>
</tr>
<tr>
<td>See website</td>
<td><strong>BASIC DRILLING TECHNOLOGY - BDT</strong></td>
<td>Houston, US</td>
<td>20-24 April 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>BASIC DRILLING TECHNOLOGY - BDT</strong></td>
<td>Houston, US</td>
<td>14-18 Dec 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>CO2 SURFACE FACILITIES - PF-81</strong></td>
<td>Midland, US</td>
<td>11-14 Nov 2019/9-12 Nov 2020</td>
</tr>
<tr>
<td>1</td>
<td><strong>CORING AND CORE ANALYSIS - CCA</strong></td>
<td>Houston, US</td>
<td>21-25 Sep 2020</td>
</tr>
<tr>
<td>1</td>
<td><strong>CORING AND CORE ANALYSIS - CCA</strong></td>
<td>London, UK</td>
<td>27-31 July 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>DRILLING FLUIDS TECHNOLOGY - DFT</strong></td>
<td>Aberdeen, UK</td>
<td>11-15 Nov 2019/26-30 Oct 2020</td>
</tr>
<tr>
<td>6</td>
<td><strong>FIELD STUDY-HEAVY OIL RESOURCES - Hofs</strong></td>
<td>Fort McMurray, CAN</td>
<td>24-26 Aug 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>MECHANICAL SPECIFICATION OF PRESSURE VESSELS AND HEAT EXCHANGES - ME-43</strong></td>
<td>Houston, US</td>
<td>18-22 May 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>PRIMARY CEMENTING-CEMENTING I - PCE</strong></td>
<td>Denver, US</td>
<td>28-31 July 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>PRIMARY CEMENTING-CEMENTING I - PCE</strong></td>
<td>Houston, US</td>
<td>14-17 Sep 2020</td>
</tr>
<tr>
<td>See website</td>
<td><strong>SEQUENCE STRATIGRAPHY: AN APPLIED WORKSHOP - SQS</strong></td>
<td>Denver, US</td>
<td>10-14 Aug 2020</td>
</tr>
<tr>
<td>5</td>
<td><strong>STRUCTURAL AND STRATIGRAPHIC INTERPRETATION OF DIPMETERS AND BOREHOLE-IMAGING LOGS - SSI</strong></td>
<td>Denver, US</td>
<td>28 Sep-2 Oct 2020</td>
</tr>
</tbody>
</table>

*For a full list of field trip courses, see petroskills.com/field*
**Petrophysics of Unconventional Reservoirs — PUR**

**INTERMEDIATE 3-Day**

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
- Recognize 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 unconventional • 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

---

**Foundation 3-Day**

NEW

This course will give attendees an introduction to fiber optics sensing in reservoirs and wells. Attendees will gain an awareness of the types of fiber available, how it can be deployed, the range of measurements that can be made and how these can be applied to resolving common well and reservoir issues. The emphasis in the course will be on distributed measurements rather than point measuring sensors. The course will discuss the differences between the main types of fiber available, the underlying physics of the measurements, and the principles of operation for the different measurements and sensor types.

Attendees will learn about the variety of conveyance and deployment methods for fiber deployment in wells. Hypothetical examples will be used to illustrate the different deployment cases. The course will give the student an understanding of the type of measurement available and how the operator can use fiber measurements in combination with other data to help design an integrated surveillance program to diagnose common well and reservoir performance issues. Case examples will be used within discussion groups to explore the measurement choices.

The student will gain an understanding of the variety and range of fiber optic interrogation units available, along with the flexibility in setup that can be applied to help enhance the system’s ability to identify specific well and reservoir issues. Examples will be shown of how this data can be integrated with other data forms to help optimise the interpretation process and generate robust well and reservoir diagnosis.

**DESIGNED FOR**

Petroleum engineers, production engineers, petrophysicists and reservoir engineers and managers who may be making technology and tool selection decisions.

**YOU WILL LEARN HOW TO**

- Select the appropriate fiber deployment options for your well
- Select the appropriate measurements for well and reservoir diagnostics
- Determine the optimal fiber interrogation units for your application
- Design a basic program for a fiber surveillance
- Understand the physics behind distributed fiber measurements
- Perform basic distributed temperature and acoustic interrogations
- Integrate fiber with other data forms to generate robust well diagnostics

**COURSE CONTENT**

Basics of fiber construction and manufacture • How fiber is selected for downhole service • The types of measurement that are commonly made with fiber • The differences between point measurements and distributed measurements • Different fiber deployment methodologies • Selection and performance characteristics of optical interrogation units • Principles behind distributed temperature/temperature estimation (DTT) • Principles of distributed acoustic interrogation (DAI) • Integration of fiber data with other data forms • Case examples with different fiber applications

**2019-2020 Schedule and Tuition (USD)**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATES</th>
<th>TUITION ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABERDEEN, UK</td>
<td>19-21 OCT 2020</td>
<td>$3850+VAT</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>27-29 JULY 2020</td>
<td>$3310</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>7-9 DEC 2020</td>
<td>$3910+VAT</td>
</tr>
<tr>
<td>PITTSBURGH, US</td>
<td>27-29 APR 2020</td>
<td>$3355</td>
</tr>
</tbody>
</table>

**PITTSBURGH, US 27-29 APR 2020 $3355**

- Gas-in-place and reserve and flow potential
- Unconventional reservoirs • 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

In-house courses deliver private, on-site training to your group, whenever, wherever, and however you need it.

Save time, money, and travel hassles by bringing our course to your site, or any location that suits you.

If you do not have enough participants for an in-house session, we may be able to schedule an on-demand public session in your location.

For more information, or to reserve training for your team, go to petroskills.com/inhouse

+1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)

All classes available at your location. Contact us today.
Capillarity in Rocks – CIR

Integration of Rocks, Log and Test Data – ILC

INTERMEDIATE 3-Day

The course provides detailed knowledge of how capillarity affects hydrocarbon distribution in a reservoir rock, and how the magnitude of capillary forces can be used to deduce valuable information about rock properties including pore throat sizes, pore network geometry, porosity, and permeability.

DESIGNED FOR
Geoscientists, petrophysicists, reservoir engineers, and research and development staff who want to gain fundamental insight into the capillary properties and hydrocarbon distribution in reservoir rocks.

YOU WILL LEARN HOW TO
- Select the appropriate capillary pressure measurement method for a set of desired results
- Close correct a set of mercury/air capillary pressure data
- Fit and analyze capillary pressure data using Thomee, Leverett-J, and Brokere-Correy methods
- Determine the representativeness of a set of capillary pressure curves within a zone of interest
- Estimate permeability from a mercury/air capillary pressure curve
- Calculate pore throat sizes from a capillary pressure curve
- Create a synthetic capillary pressure curve and estimate the air permeability from a petrophysical analysis
- Obtain values for interphase tension
- Convert mercury/air capillary pressure curves to hydrocarbon/air capillary pressure curves
- Determine saturation-height distribution in a single-pore system rock or in a multiple-pore system rock
- Determine irreducible water saturation
- Estimate the length of a transition zone
- Determine clay-bound water using Klein-Hill-Shirley method
- Compare/contrast capillary pressure data with NMR data
- Determine the maximum column of hydrocarbon that a specific sealing layer can sustain without leaking

COURSE CONTENT
Capillary pressure applications in reservoir characterization • Rock properties from mercury/air capillary pressures • Capillary pressure data representativeness • Capillary forces in reservoir rocks; their measurement • Capillary pressure data fitting methods • Representing a large number of capillary curves (averaging) • Permeability from capillary pressure curves and petrophysics • Saturation-height functions • Surface phenomena, capillarity, wettability, and interphase tension • The competition between capillary and gravity forces • Relationships between initial and residual saturations • Interpretation of single and multiple pore system rocks • Clay-bound water • Capillary pressure vs. NMR • Seal capacity

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOUSTON, US</td>
<td>4-6 MAY 2020</td>
<td></td>
<td>$3370</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>4-6 NOV 2020</td>
<td></td>
<td>$3370</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>16-18 DEC 2019</td>
<td>19-21 DEC 2019</td>
<td>$3855+VAT</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>19-21 DEC 2020</td>
<td></td>
<td>$3910+VAT</td>
</tr>
</tbody>
</table>

* plus computer charge

Nuclear Magnetic Resonance (NMR)

Petrophysics – NMRR

INTERMEDIATE 5-Day

NMR today is a must-have technology for many companies because of the value-added to formation-evaluation. Some of the applications include: Matrix-independent, ’sourceless’ porosity, low-resistivity/low-contrast, fresh-water reservoirs, and carbonates. NMR completes the formation-evaluation story for many companies now using the technology regularly because it either validates conventional log and test data or it independently provides an answer unavailable from other sources. Certainly, in many instances, the absence NMR data too frequently leaves the formation-evaluation story incomplete and uncertain. This four-day, PetroSkills NMR Petrophysics course will provide geoscientists and engineers with a basic to intermediate skill-level for using NMR data in reservoir characterization workflows. Course design is a balance between information transfer, discussion, training, and practical exercise. The expectation is that participants will return to their jobs with the skill-set shown below.

DESIGNED FOR
Geoscientists and engineers interested in learning how NMR technology fits within the reservoir characterization/reservoir modelling workflow and how to use the data to best advantage.

YOU WILL LEARN HOW TO
- Understand how NMR works for petrophysical applications
- Understand the language of NMR technology (mnemonics)
- Use NMR data for core and log applications
- Understand NMR fits into predictive rock-kiln schematic
- Plan core and log acquisition programs
- Identify data quality indicators and what they mean
- Use core data for log calibration
- Use contractor deliverable to produce an interpretation
- Fit NMR data with conventional log data
- Process raw data

COURSE CONTENT
Objectives of integration • Key rock properties for formation evaluation • Impact of depositional environment on 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 • Plastic and carbonate rock types • Important reservoir rock parameters • Cementation and saturation components • EC fluid sensitivity • Overview 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

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENER, US</td>
<td>20-23 APR 2020</td>
<td></td>
<td>$4040</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>4-6 NOV 2019</td>
<td></td>
<td>$4040</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>8-11 NOV 2020</td>
<td></td>
<td>$5075+VAT</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>10-13 AUG 2020</td>
<td></td>
<td>$4550</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>10-13 AUG 2020</td>
<td></td>
<td>$5235+VAT</td>
</tr>
</tbody>
</table>

* plus computer charge

Shaly Sand Petrophysics – APS

INTERMEDIATE 5-Day

This course tackles the important and nontrivial problem of practical formation evaluation in shaly sand provinces. The presence of clay minerals and shale laminations strongly affects the physical properties of the reservoir rock and induce significant effects on the response of most logging tools; these perturbations often result in low resistivity/low contrast pay zones that can be significant hydrocarbon producers but are often overlooked. A properly designed analytical program (cores and logs) for the evaluation of shaly sands can add significant reserves in existing fields and can allow for the rapid identification of potential by-passed pay zones in exploration wells. The course is practical and participants are given laboratory and field problems to emphasize the instruction. At the end of the course, the participants will be able to identify and evaluate pay intervals in shaly sands.

DESIGNED FOR
Petrophysicists, geologists, geophysicists, engineers, and explorationists involved in all phases of reservoir evaluation in shaly sand provinces.

YOU WILL LEARN HOW TO
- Determine the nature, volume, and distribution of clay minerals and shales in shaly sands and their impact on the analyses of cores and logs
- Integrate petrophysical, core, and log data to significantly improve reservoir evaluation in shaly sands and other rocks that contain significant amount of microporosity
- Bring order out of chaos on porosity-permeability cross-plots using rock typing
- Evaluate effective and total porosity, fluid saturations, and producibility of shaly sands using time-tested specific methods
- Evaluate the strengths and weaknesses of advanced logging tools for characterization of shaly sands

COURSE CONTENT
Review of log interpretation techniques in clean formations • Core analyses and applications of specific core tests • Petrophysical analysis (thin section, X-ray diffraction SEM/EDS) for shaly sand evaluation • The nature of clay minerals and shale laminations and how they are distributed in shaly sands • Influence of clay minerals and shale laminations on petrophysical properties • Occurrence of clay minerals and shale laminations in reservoir rocks and relation to depositional environment and diagenesis • Integration of petrophysical, core, and log data for evaluation of shaly sands • Effects of clay minerals and shale laminations on log responses in shaly sands; various methods of shale content evaluation • Models for porosity and saturation determination: total and effective porosity; and Archie, Waxman-Smits, Dual Water and Juarez saturation methods • Prediction of permeability and producibility from logs in shaly sands: identification of bypassed pay • Use of advanced logs (NMR, BHI, Dipmeters) integration with core data for purposes of evaluation

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Start Date</th>
<th>End Date</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENER, US</td>
<td>4-6 NOV 2019</td>
<td></td>
<td>$4960</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>11-15 MAY 2019</td>
<td></td>
<td>$4960</td>
</tr>
<tr>
<td>HOUSTON, US</td>
<td>4-6 NOV 2019</td>
<td></td>
<td>$4960</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>6-10 JULY 2020</td>
<td></td>
<td>$5275+VAT</td>
</tr>
</tbody>
</table>

* plus computer charge

+1.918.828.2500  | petroskills.com  | +1.800.821.5933 (toll free North America)  | All classes available at your location. Contact us today.
**Structural and Stratigraphic Interpretation of Dimples and Borehole-Imaging Logs**

- **5-Day**

**FIELD TRIP**

Dimples 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. Dimples 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, dimples and borehole images are used to identify paleoconnent directions, bounding surfaces, facies, thin beds, net-sand, and secondary porosity. The key objective of dimple 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 dimples 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 paleoconnent 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 dimples and borehole images • Data acquisition and processing • Qualify 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, scourred surfaces, slumps • Determination of paleoconnent 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

---

**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 modeling 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 mechanisms 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 demonstrations) • Stress orientation techniques and models of rock behavior • Borehole stability • Sand control • Fracture mechanics • Unconventional reservoir applications • Reservoir engineering applications • Wireline log predicted mechanical properties • Data integration

---

**Cased Hole Formation Evaluation – CH**

**SPECIALIZED**

4-Day

This course teaches skills necessary to practice the art and science in accurately determining remaining hydrocarbons using modern dual-detector and emerging multi-detector pulsed neutron (PN) tools. The latter can compute multiple petrophysical parameters simultaneously and delineate gas better, especially in low porosity, but add to data and interpretation complexity. The course discusses measurement-to-interpretation techniques used by various players and thus offers an insight into their effectiveness in conditions of increasing wellbore and formation complexities. The user will gain a better understanding of why tools from different service companies, often recording similar raw data in near-identical conditions, may differ significantly in their predictions. The course will help users of the technology make targeted tool choices, plan logging jobs better, and perform in-house interpretation if needed.

**DESIGNED FOR**

Geologists, formation evaluations specialists, completion and production engineers, and managers who may be making technology- and tool-choice decisions.

**YOU WILL LEARN HOW TO**

- Determine adequacy of PNC capture vs. C/O logging methods for saturation calculation, especially through complicated well bores and in complex formations
- Calculate water and steam saturations from Pulsed Neutron Capture (PNC) Logs
- Correct petrophysical calculations for the influence of salinity
- Distinguish gas/steam from liquids
- Compute oil saturation directly from Carbon/Oxygen technique
- Locate water entry and judge zonal communication
- Judge where specialty methods, such as Log-Inject Log, to estimate remaining oil vs. residual oil saturation, pseudo-density, etc., may not work
- Make appropriate tool choices
- Perform interpretation QC and plan logging jobs

**COURSE CONTENT**

Basics and application of nuclear logging in general (briefly) and cased-hole logging in particular • Attributes of various modern dual-detector and emerging multi-detector cased-hole logging tools used in the industry • Cased-hole application of pulsed neutron capture (PNC) methods in clean and shaly formations, carbon/oxygen logging in low or variable salinity conditions in water and steam floods where PNC methods do not work, and direct neutron (FNN) methods to Locate oil, gas, water, gas/liquid, or steam/liquid contacts • Compute water, oil and gas/steam saturation (in steam floods), and residual saturation using log-inject-log methods • Application of above in open-hole completions • Differences in saturation interpretation methods across vendors • Oxygen activation to locate water entry • Job planning and best practice parameters for successful monitoring

---

**Wireline Formation Testing and Interpretation – WFT**

**SPECIALIZED**

5-Day

Formation testing and sampling tools (FTs) with wireline and while-drilling are widely used in exploration/appraisal and reservoir development projects. Over the past two decades, modern tools, such as MDT, PCT, RFT, and FRFT, have emerged to become 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 alternative 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, FLM, 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

---

2019-2020 Schedule and Tuition (USD)

**DENVER, US**

- **2019-2020 Schedule and Tuition (USD)**
  - **HOUSTON, US**
    - 28 SEP - 2 OCT 2020
      - $4820
    - 13-17 APR 2020
      - $4650
  - Includes field trip

**2019-2020 Schedule and Tuition (USD)**

- **HOUSTON, US**
  - 18-20 NOV 2019
    - $3365
  - 16-18 NOV 2020
    - $3430

**2019-2020 Schedule and Tuition (USD)**

- **HOUSTON, US**
  - 14-17 OCT 2019
    - $4055
  - 12-15 OCT 2020
    - $4130

**2019-2020 Schedule and Tuition (USD)**

- **DUBAI, UAE**
  - 14-18 JUNE 2020
    - $5750+VAT
  - **HOUSTON, US**
    - 30 MAR-3 APR 2020
      - $4610
    - 24-28 AUG 2020
      - $3335+VAT

All classes available at your location. Contact us today.

+1.918.828.2500 petroskills.com | +1.800.821.5933 (toll free North America)
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 and Asset Management, from exploration to abandonment. Unconventional shale (tight oil and gas) and conventional oil and gas are covered. The participant will understand how and when geoscience and engineering professionals use technology to determine and then 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.

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
- Basic reserves and production volume concepts
- 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
- The relationship between depositional environments and geological settings
- Exploration concepts
- Elements of a successful petroleum system
- Key differences between unconventional and conventional petroleum systems
- Features of structural contour and isopach maps
- The basic reservoir rock properties and the significance of core samples
- The roles involved in exploration
- Rig type classification and selection for onshore and offshore drilling
- and more...

COURSE CONTENT
E&P industry and asset life cycle • Petroleum geology • Hydrocarbon reservoirs • Rock and fluid properties • Surface/subsurface exploration • Drilling operations and well completions • Production operations

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

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOUSTON, US</td>
<td>7-11 OCT 2019</td>
<td>$4255</td>
</tr>
<tr>
<td></td>
<td>2-6 MAR 2020</td>
<td>$4310</td>
</tr>
<tr>
<td></td>
<td>13-17 JULY 2020</td>
<td>$4310</td>
</tr>
<tr>
<td></td>
<td>28 SEP-2 OCT 2020</td>
<td>$4310</td>
</tr>
<tr>
<td>KUALA LUMPUR, MYS</td>
<td>18-22 NOV 2019</td>
<td>$5120</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>4-8 NOV 2019</td>
<td>$4935+VAT</td>
</tr>
<tr>
<td></td>
<td>1-5 MAY 2020</td>
<td>$4935+VAT</td>
</tr>
<tr>
<td></td>
<td>2-6 NOV 2020</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>NEW ORLEANS, US</td>
<td>20-24 APR 2020</td>
<td>$4255</td>
</tr>
<tr>
<td>OKLAHOMA CITY, US</td>
<td>7-11 AUG 2020</td>
<td>$4255</td>
</tr>
<tr>
<td>PITTSBURGH, US</td>
<td>22-26 JUNE 2020</td>
<td>$4305</td>
</tr>
<tr>
<td>SINGAPORE</td>
<td>16-20 NOV 2020</td>
<td>$5225</td>
</tr>
</tbody>
</table>

Self-paced, virtual course - start anytime.
Tuition US$3570

FOR MORE INFORMATION, VISIT
PETROSKILLS.COM/BPTONLINE

Basic Drilling, Completion, and Workover Operations – BDC

BASIC  5-Day

This course presents the basics of drilling and completion operations, plus post-completion enhancement (workovers). Participants will learn to visualize what is happening downhole, discover what can be accomplished, and learn how drilling and completion can alter reservoir performance. Learn to communicate with drilling and production personnel. No experience or prerequisites are required.

YOU WILL LEARN
- How to comprehend drilling and workover reports
- What can be done within open-hole and cased wells, as a part of reservoir management
- How drilling practices can optimize cash flow and ultimate recovery
- How to communicate with drilling and production personnel

COURSE CONTENT
Overview of the drilling process • Language of drilling, completing, and well intervention • Drill string components, bits and accessories • Drilling fluids and hydraulics • Hole problems, stuck pipe, side-tracking and fishing • Cores and coring • Electric logging, MWD, LWD • Casing design and installation • Primary and remedial cementing • Directional, horizontal, multilateral and under-balanced drilling • Wellhead equipment and trees • Options for completions and workovers • Tubing, packers and completion equipment • Safety and flow control devices • Open hole completions • Perforating • Coil tubing operations • Wireline techniques • Well stimulation - surfactants, solvents, acids, acidizing, hydraulic fracturing • Formation and sand control - mechanical retention, chemical consolidation, and gravel packing • and more...

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABERDEEN, UK</td>
<td>9-13 MAR 2020</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>BAKERSFIELD, US</td>
<td>19-23 MAR 2020</td>
<td>$4255</td>
</tr>
<tr>
<td>CALGARY, CAN</td>
<td>21-25 SEP 2020</td>
<td>$4255+GST</td>
</tr>
<tr>
<td>DALLAS, US</td>
<td>14-18 OCT 2019</td>
<td>$4170</td>
</tr>
<tr>
<td>DENVER, US</td>
<td>6-10 JUNE 2020</td>
<td>$4255</td>
</tr>
<tr>
<td>KUALA LUMPUR, MYS</td>
<td>18-22 NOV 2019</td>
<td>$5120</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>9-13 DEC 2019</td>
<td>$4255</td>
</tr>
<tr>
<td></td>
<td>15-19 JUNE 2020</td>
<td>$4310</td>
</tr>
<tr>
<td></td>
<td>20-24 AUG 2020</td>
<td>$4310</td>
</tr>
<tr>
<td></td>
<td>7-11 DEC 2019</td>
<td>$4310</td>
</tr>
<tr>
<td></td>
<td>13-17 JULY 2020</td>
<td>$5225</td>
</tr>
<tr>
<td>LONDON, UK</td>
<td>10-14 AUG 2020</td>
<td>$5035+VAT</td>
</tr>
</tbody>
</table>

Self-paced, virtual course which is an enhanced version of the face-to-face public session.

VIRTUAL DELIVERY $3930
PETROSKILLS.COM/BDCONLINE
Basic Petroleum Geology – BG

BASIC 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.

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

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 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 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 at a basic level or to communicate with others that use it.

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 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

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

21 SEP-13 NOV 2020 US$4325
4 MAY-26 JUNE 2020 US$4325

PETROSKILLS.COM/BLENDED-BGP

2019-2020 Schedule and Tuition (USD)

HOUSTON, US
11-15 MAY 2020 $4420
30 NOV-4 DEC 2020 $4420
KUALA LUMPUR, MYS
13-17 JULY 2020 $5235
LONDON, UK
7-11 OCT 2019 $5045+VAT
28 SEP-2 OCT 2020 $5145+VAT

2019-2020 Schedule and Tuition (USD)

HOUSTON, US
18-22 NOV 2019 $4225
20-24 APR 2020 $4310
16-20 NOV 2020 $4310
LONDON, UK
15-19 JUNE 2020 $5035+VAT

All classes available at your location. Contact us today. +1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)
CROSS-TRAINING

Carbonate Reservoirs – PCR

FOUNDATION 5-Day
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. Moote 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 margins, the isolated platform, and the mixed carbonate-siliciclastic system • Characteristics of carbonate pore systems • Diagnosis, porosity evolution, and pore size distribution at the time of burial • The fate of early-formed porosity during burial • The potential value of diagenitization, including by hydrothermal processes • The problem of H5 in carbonate reservoirs • Natural fractures in carbonates • Case histories and exercises from the Americas, Europe, and Asia

Sandstone Reservoirs – SR

FOUNDATION 5-Day
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 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

Operations Geology – OG

INTERMEDIATE 5-Day
At the end of this integrated course, participants will be able to contribute effectively to the preparation of planned wells and their concurrent operations during the exploration, appraisal, and development phases. As geoscientists, petroleum engineers, well engineers, and production technologies 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. Understanding of all operations should greatly improve the effectiveness of the Operations Geologist. 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
• Assess 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 fluidic: 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

Production Logging – RMP

INTERMEDIATE 5-Day
Production logging refers to acquiring a suite of logging measurements in a completed well that is either on injection or production to evaluate the flow performance of the well or the reservoir. Special purpose production logging instruments can evaluate the well completion or look behind the pipe to evaluate the formation and its fluids in the near-well bore vicinity. Production logs are playing an increasing role in modern reservoir management by providing the only means of directly identifying downhole fluid movement. This course will cover single-phase and multi-phase fluid flow in pipes, the theoretical bases of production logging techniques, production log interpretation, and operational considerations in acquiring production logs. Numerous field examples are used to illustrate the principles of production log interpretation.

DESIGNED FOR
Petroleum and drilling engineers and managers, reservoir engineers, subsurface engineers, production engineers/technologists, petrophysicists, log analysts, and anyone interested in understanding production logs and cased-hole surveys.

YOU WILL LEARN HOW TO
• Measure zonal inflows in producing wells using temperature measurements
• Measure multi-phase flow using temperature, spinner (flowmeter), and fluid buildup measurements
• Identify flow behind pipe with temperature, radioactive tracer, and spinner (flowmeter) measurements
• Interpret cement bond logs and ultrasonic logs to determine cement quality
• Measure flow inside and outside casing with pulsed neutron tools
• Apply specialty tools (array holdup and spinners and pulsed neutron tools) for flow profiling in high angle/horizonal wells
• Confirm the location of some types of completion components using pulsed neutron measurements
• Design a logging program using the appropriate production logging services for well diagnosis and reservoir surveillance

COURSE CONTENT
Wellbore environment and tool deployment considerations • Depth control issues and natural gamma ray logging • Cement bond logs • Ultrasonic imaging logs • Conventional temperature logs • and more...

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

20 APR-5 JUNE 2020 US$4325
PETROSKILLS.COM/VIRTUALRMP

2019-2020 Schedule and Tuition (USD)

CALEDAR, CAN
21-25 OCT 2019 $4270+VAT
DENVER, US
20-24 JULY 2020 $4405
DUBAI, UAE
17-21 OCT 2019 $5445+VAT
DUNDEE, UK
23-27 SEP 2019 $5150+VAT
GOLDSBORO, US
15-19 NOV 2019 $5500+VAT
HOUSSON, US
9-13 MAR 2020 $4410
HONG KONG, CHN
16-20 OCT 2019 $5250+VAT
LONDON, UK
16-20 OCT 2019 $4440
LONDON, UK
18-22 MAR 2020 $5135+VAT
LONDON, UK
18-22 MAY 2020 $4440

* plus computer charge

2019-2020 Schedule and Tuition (USD)

HOUSTON, US
14-18 OCT 2019 $5445+VAT
LONDON, UK
12-16 SEP 2019 $5150+VAT
LONDON, UK
13-17 JULY 2020 $4410

PETROSKILLS.COM/VIRTUALRMP

* plus computer charge

+1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)  | All classes available at your location. Contact us today.
Reservoir Engineering for Other Disciplines – REO

FOUNDATION 5-Day

This course gives the non-reservoir engineer a better understanding of reservoir engineering practices and limitations. The course is designed to provide a good understanding of reservoir engineering processes, the required data, and the limitations on the engineers’ analyses and interpretations. The course also provides engineers who are already trained in the other upstream petroleum industry technical disciplines with an understanding of the current state-of-the-art practice of reservoir engineering.

DESIGNED FOR
Engineers and geoscientists now working in an asset environment where they need to better understand the principles and limitations of the methods and procedures employed by the reservoir engineers with whom they work. Participants should have three or more years of technical experience in the upstream petroleum industry.

YOU WILL LEARN HOW TO
• Utilize the tools and techniques of the reservoir engineer
• Apply the principles of reservoir engineering
• Develop reservoir, well performance and asset management options

COURSE CONTENT
Distribution of Reservoir Properties: structure, fluid contacts, water saturation, and pressure • Rock Properties: porosity, permeability, capillary pressure, and relative permeability • Fluid Properties: phase behavior of reservoir fluids; properties of oil, gas, and water; PVT Sampling; and PVT laboratory reports • Volumetric Calculation of Initial Hydrocarbons in Place: oil in place, gas in place, addressing uncertainty using probabilistic methods, reservoir booking practices, and reservoir recovery efficiencies • Material Balance Methods: oil reservoir material balance, Havlena Odeh method, gas material balance, volumetric, compaction, water drive, and compartmentalized reservoirs • Fluid flow and well performance: radial and linear flow, transient, pseudosteady state, steady state flow regimes, productivity of vertical and horizontal wells • Aquifer influx • Immiscible Displacement: fluid displacement process, fractional flow, Buckley-Leverett, Wepfer, water under running, and gas overriding • Coring and Cursing; description of process, critical rates, using horizontal wells • Reservoir Types and Drive Mechanisms: gas reservoirs - volumetric, water drive and compaction drive; oil reservoirs - solution gas drive, drive water, water drive, cap gas expansion, combination drive, naturally fractured and critical reservoir fluid drive • Reservoir Simulation: why simulate, types of reservoir simulation models, setup up a simulation model, conducting a simulation study • Field Development Planning: characteristics, planning tools, deliverability issues, determining a well count and rate forecast

RESERVOIR CHARACTERIZATION
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, 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 responsibly to 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 the 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 continuity
• 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 • The scale and resolution of data • Variograms, correlation length • Time, rock, and flow units • Seismic attributes • Upscaling, streamline simulations • Decision trees; value of information • Giving and receiving feedback • The future of Reservoir Characterization

All classes are available at your location. Contact us today.

+1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)
Naturally Fractured Reservoirs: Geologic and Engineering Analysis – FR

SPECIALIZED 5-Day

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

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, acronyms, 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 technologies are 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 sand and carbonate acid jobs
• Design 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 dynamics between production technology and other disciplines

COURSE CONTENT
Role and tasks of production technology • Selection, evaluation, design, and application of reservoir management tools, fracture treatments, and sand control • Economics in fracture stimulation and completion • Advanced well completion technologies and applications • Fracture characterization and evaluation

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

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 that they can apply 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 analyst to ensure that they are properly time managed
• 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 techniques, choice of parameter distributions, 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 exercises) • and more...
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, petroleum engineering or drilling should attend. 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
• 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 • Finding and mitigating risks • Learning, continuous improvement, and quality control • Project team management • Petroleum case studies and exercises

2019-2020 Schedule and Tuition (USD)

HOUSTON, US 4-8 NOV 2019 $4425
26-30 OCT 2020 $4610
KUALA LUMPUR, MYS 21-25 SEP 2020 $5423
LONDON, UK 8-12 JUNE 2020 $5235(+VAT)

2019-2020 Schedule and Tuition (USD)

DENVER, US 16-20 SEP 2019 $4220
14-18 SEP 2020 $4305
HOUSTON, US 22-26 APR 2019 $4225
ORLANDO, US 30 NOV-4 DEC 2020 $4355

* plus computer charge

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 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 leaders, 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 unloading 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 people’s 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

2019-20 Schedule and Tuition (USD)

HOUSTON, US 7-8 MAY 2020 $2645

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

2019-20 Schedule and Tuition (USD)

HOUSTON, US 7-8 MAY 2020 $2645
Our Participants Say It Best.

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

- DIAS

3D SEISMIC ATTRIBUTES FOR RESERVOIR CHARACTERIZATION • SARC • HOUSTON

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

- JESSICA

BASIC GEOPHYSICS • GSP • HOUSTON

"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."

- KABIR

PERFORMANCE ANALYSIS, PREDICTION AND OPTIMIZATION USING NODALITY ANALYSIS • POZ • OSHA

"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."

- DEREK

BASIC DRILLING, COMPLETION AND WORKOVER OPERATIONS • SGD • BAKERSFIELD

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

- JESSICA

BASIC GEOPHYSICS • GSP • HOUSTON

"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."

- KABIR

PERFORMANCE ANALYSIS, PREDICTION AND OPTIMIZATION USING NODALITY ANALYSIS • POZ • OSHA

"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."

- DEREK

BASIC DRILLING, COMPLETION AND WORKOVER OPERATIONS • SGD • BAKERSFIELD

Applied Environmental Management Systems – AEM

FOUNDATION 5-Day

Since the Rio de Janeiro Earth Summit (UNCED) held in 1992, environmental issues have been drawn to the forefront of organizations’ operations and possibly their reputations. A review of the world’s press often reveals spills, toxic releases, fires, and other pollution events. There are efficiency opportunities from better use of energy, water and from reducing waste in a systematic way. Participants will receive a template Environmental Management System (EMS) manual for their own use as part of the study materials. This class provides a complete review of the international standard for environmental management, ISO 14001:2015, as well as other environmental management techniques. Over five days, the class works through the PDCA improvement cycle provided by ISO 14001, teaching the tools and techniques of excellent practice. The course includes a week-long practical implementation case study set in the fictional highly-realistic setting of oil products distribution company Melvis Group where the new learning is validated through application. Please see www.melvisgroup.com for more information.

DESIGNED FOR

Environmental professionals seeking a deeper knowledge of environmental management systems (EMS) and/or external certification to ISO 14001, H&S managers wanting to broaden their knowledge in a related discipline, project managers, other staff with delegated environmental responsibilities such as those related to energy, waste, or water.

YOU WILL LEARN HOW TO

- Successfully design and use the principle elements of an environmental management system in a typical petrochemical organisation
- Identify and integrate key tools associated with Occupational Health and Safety (OH&S) management, including environmental impact assessment, setting and progressing environmental objectives, emergency preparedness, and incident investigation
- Reflect on, shape, and initiate improvements in the environmental (HSE) culture of an organization
- Communicate a powerful improvement message to a team of senior leaders

COURSE CONTENT

Content of the organization • Leadership and commitment • OH&S policy • Roles, responsibilities, and authorities • Actions to address risks and opportunities • Objectives and planning to achieve them • Support (competence, awareness, communication, documentation) • Operational control • Emergency preparedness • Performance evaluation (monitoring, internal audit, management review) • Improvement

Listen to what course attendees are saying! Go to petroskills.com/listen

PetroSkills®

+1.918.828.2500 | petroskills.com | +1.800.821.5933 (toll free North America)

All classes available at your location. Contact us today.

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Occupational Health and Safety</td>
<td>LONDON, UK</td>
<td>15-19 JUNE 2020</td>
<td>$5135+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Systems – HSM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>25-29 NOV 2019</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Occupational Health and Safety</td>
<td>LONDON, UK</td>
<td>15-19 JUNE 2020</td>
<td>$5135+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Systems – HSM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>25-29 NOV 2019</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>15-19 JUNE 2020</td>
<td>$5135+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>25-29 NOV 2019</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>15-19 JUNE 2020</td>
<td>$5135+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>25-29 NOV 2019</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>15-19 JUNE 2020</td>
<td>$5135+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2019-2020 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Course</th>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Systems – HSM</td>
<td>LONDON, UK</td>
<td>25-29 NOV 2019</td>
<td>$5035+VAT</td>
</tr>
<tr>
<td>Management Systems – AEM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IN-HOUSE TRAINING
WHEN YOU NEED IT,
WHERE YOU NEED IT.

DO YOU HAVE TEAM TRAINING NEEDS? WE CAN HELP!

In-house courses deliver private, on-site training to your group, whenever, wherever, and however you need it.

Save time, money, and travel hassles by bringing our course to your site, or any location that suits you.

If you do not have enough participants for an in-house session, we may be able to schedule an on-demand public session in your location.

For more information, or to reserve training for your team, go to petroskills.com/inhouse
TO VIEW OUR COURSES
IN OTHER DISCIPLINES, VISIT:

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

**Facilities**
- Gas Processing
- Process Facilities
- Offshore & Subsea
- Pipeline Engineering
- Instrumentation, Controls & Electrical
- Mechanical Engineering
- 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
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:

- Applied Reservoir Engineering
- 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 Principles
- NODAL Analysis Workshop
- Process Safety Engineering
- Production Logging
- Production Operations 1
- Production Technology for Other Disciplines
- Scale Identification, Remediation and Prevention Workshop

Coming Soon: Pipeline, Drilling Principles, Geomechanics, Petroleum Geology, and ICE.