## Well Construction / Drilling

### Course Progression Matrix

The Course Progression Matrix below shows how the Well Construction/Drilling courses in this section are structured within each topic, from Basic to Specialized. On either side of the Well Construction/Drilling section, you will see courses in associated disciplines for cross-training.

The first two courses in this section are two of our most popular and build the foundation of the discipline. Basic Drilling Technology – BDT provides a basic overview of the drilling process, while Well Design and Engineering – WDE on page 2 integrates all major well design technologies. If you need to build a foundation around directional and horizontal wells, be sure to see Directional, Horizontal, and Multilateral Drilling – DHD on page 5. Also, be sure to check out our exciting deepwater course Deepwater Well Engineering - DWE on page 4.

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

<table>
<thead>
<tr>
<th>Mr. Peter Arko</th>
<th>Mr. Richard Carden</th>
<th>Mr. Steve McKeefer</th>
<th>Dr. Don Schmidt</th>
<th>Mr. Larry Wilson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. George Armstead</td>
<td>Mr. Kevin Cutler</td>
<td>Mr. Steve Metcalfe</td>
<td>Dr. Subhash Shah</td>
<td>Mr. Dicke Wright</td>
</tr>
<tr>
<td>Mr. James Bond</td>
<td>Mr. Mark Hackler</td>
<td>Mr. Hector Moreno</td>
<td>Mr. Mark Summers</td>
<td>Mr. Bob Westmark</td>
</tr>
<tr>
<td>Mr. Jerry Calvert</td>
<td>Mr. Aaron Klein</td>
<td>Dr. Leon Robinson</td>
<td>Mr. Bob Westmark</td>
<td>Mr. Bob Westmark</td>
</tr>
</tbody>
</table>

### Course Content

#### Basic Drilling Technology – BDT

This course addresses the technology used to drill wells from a fundamental view point. Equipment and procedures involved with drilling oil and gas wells are described for those who are interested regardless of academic background. The overall drilling process is presented along with definitions and descriptions of drilling equipment. This provides the vocabulary to understand the drilling process. The various components and procedures are discussed in greater detail with explanations of the basic science concepts which guide these processes. Subjects include descriptions of drill bits, directional drilling, drilling fluids, solids control, cementing, casing, well bore stability, well control, measurement-while-drilling techniques, stuck pipe, lost circulation, and well bore hydraulics.

Some technology enhancements are included to improve understanding of drilling operations for all participants, with or without a science background. A discussion of clay mineralogy helps understand well bore instability and drilling fluids. A discussion of pressure and pressure effects helps explain many of the procedures and problems associated with drilling wells. Rocks behave differently under pressure and understanding this behavior helps in understanding drilling performance. Some discussions of drilling include mathematical explorations for those involved with the engineering aspects of drilling operations; however, the concepts and intent of these mathematical equations will be explained in simple terms. After all various components and procedures are discussed, the information contained in morning reports is explained and used as a summary of the course content.

#### Designed For

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

#### You Will Learn

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

#### Course Content

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

### 2019 Schedule and Tuition (USD)

<table>
<thead>
<tr>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
</tr>
</thead>
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<tr>
<td>Houston, US</td>
<td>22-26 APR</td>
<td>$4500</td>
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<tr>
<td></td>
<td>15-19 JULY</td>
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<tr>
<td></td>
<td>16-20 DEC</td>
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</tr>
<tr>
<td>London, UK</td>
<td>16-20 SEPT</td>
<td>$5025+MBT</td>
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† includes field trip
### Casing and Cementing – CAC

**BASIC**

This course builds a firm foundation in the principles and practices of designing, planning, and conducting successful casing and cement jobs. The course uses a process-based perspective that takes participants from initial casing depth and size selection, casing and liner design procedures, casing running practices, and planning and executing primary cementing through remedial cementing and plugging operations. In addition to the necessary technical information and procedures, the course is laced with considerable practical, experience-based content. Participants will be furnished Dr. Byrom’s textbook, “Casing and Liners for Drilling and Completion,” and computer spreadsheets to facilitate routine calculations.

**DESIGNED FOR**

Personnel responsible for planning, overseeing, and conducting casing and cementing operations; operator and service personnel.

**YOU WILL LEARN**

* Selection of casing sizes and setting depths to achieve well objectives
* Determination of casing loads for design purposes
* To design casing properties to meet burst, collapse, and tensile strength requirements
* To conduct casing running operations safely and successfully
* Specification of cement slurry properties and volumes to meet well objectives
* Determination of best procedures for attaining successful primary cementing
* To conduct stage jobs, squeeze jobs, and set cement plugs

**COURSE CONTENT**

Selecting casing and hole sizes • Setting depths • Casing loads • Selecting casing connections • Casing stress calculations • Cement and cement additives • Selecting appropriate slurries • Mud removal and cement placement • Stage cementing, squeezes, and plugs • Preventing gas migration • Cementing calculations • Cementing equipment • Wellhead equipment

### Well Design and Engineering – WDE

**FOUNDATION**

Well Design and Engineering integrates all major well design technologies from pre-spud to TD. Participants are actively engaged in every aspect of the technical activities required to deliver a cost-effective well plan while also gaining valuable perspective on how the overall process should be managed in a dynamic team environment. The workshop content is often customized to address technologies and practices that may be specific to a project or operational situation. The single most important goal of the workshop is to draw the linkages between the design topics and to leave the participants with an understanding that each decision has influence on those that follow. Intensity mounts as the course progresses and each design topic builds on those that came before. Design iterations are commonly required, and seemingly unrelated decisions push teams into situations of uncomfortable operational risk. On the last day, each team presents their completed design before the class and an invited panel of industry professionals. A scientific calculator is required and a laptop computer is strongly recommended.

**DESIGNED FOR**

Drilling engineers, completion engineers, and drilling supervisors involved with drilling operations and well planning.

**YOU WILL LEARN HOW TO**

* Understand the responsibilities of a well planner as a designer and project manager
* Review offset analysis and data gathering
* Understand the influence of completion design and production requirements on well design
* Identify trajectory design issues and their influence on torque and drag, wellbore stability, and future intervention
* Develop specific casing design skills including casing point selection; design load case development; burst, collapse and tension calculations; controlling load and safety factor determination and select appropriate size, weight and grade
* Perform cement slurry and displacement volume calculations
* Complete drill string and BHA designs and failure prevention assessment for each hole section, and review for directional well applications
* Understand different bit types and applications, and perform calculations to support bit run economics
* Optimize hydraulics for each hole interval based upon wellbore, fluids and drill string configurations
* Compile risks to well delivery, and develop mitigations and contingency plans
* Develop minimum rig capability specifications to deliver well requirements
* Present and defend a well plan to management

### Drilling Fluids Technology – DFT

**FOUNDATION**

This course is designed for engineers and field personnel involved in the planning and implementation of drilling programs. The seminar covers all aspects of drilling fluids technology, emphasizing both theory and practical application. Hands-on laboratory exercises are included in the five-day Houston sessions. Drilling is a complex operation requiring the marriage of different technologies and disciplines. Today’s drilling personnel must have a working knowledge of drilling fluid in order to effectively drill a well. The course provides the fundamentals necessary to drill a well whether it is a shallow well or a complex, high pressure well. This course is valuable for anyone who needs to understand the fundamental aspects of drilling fluids.

**DESIGNED FOR**

Drilling supervisors, drilling engineers, toolpushers, managers, and technical support personnel involved with drilling operations.

**COURSE CONTENT**

Cement, cement additives and displacement • Casing and drill string design, planning phase and at the rig • Bit selection • Cement penetration rate • Hole cleaning, sloughing shale, lost circulation, stuck pipe and fishing operations • Drilling fluids • Drilling composite properties of water-based and non-aqueous drilling fluid systems • Selection of water phase salinity for borehole stability • API water-based and non-aqueous drilling mud tests • Adjustment of non-aqueous fluids • Managing fluid loss control and environmental compliance

### Drilling Practices – DP

**FOUNDATION**

The two-week course is designed for engineers and field personnel involved in the planning and implementation of drilling programs. The seminar covers all aspects of drilling technology, emphasizing both theory and practical application. Drilling is a complex operation requiring the marriage of different technologies and disciplines. Today’s drilling personnel must have a working knowledge of all these disciplines in order to effectively drill a well. The course provides all the fundamentals necessary to drill a well whether it is a shallow well or a complex, high pressure well. Computer programs are used to design many aspects of the modern well and the course will provide the participants with the theory behind most programs along with practical implementation. Participants are required to bring a scientific calculator. For in-house courses, the instructors of this course will accept examples from your company for analysis in the class as one of the demonstration exercises. Please contact PetroSkills Training for a list of the information and support data required, as well as the necessary lead-time.

**DESIGNED FOR**

Drilling supervisors, drilling engineers, toolpushers, managers and technical support personnel.

**YOU WILL LEARN HOW TO**

* Review drilling data and plan the well
* Incorporate completion plans into the drilling plan
* Drill a well cost effectively and maximize penetration rate
* Evaluate stuck pipe problems and avoid potential problems
* Evaluate and maintain drilling fluids
* Optimize hole cleaning
* Design casing, drill string and BOP/wellheads
* Evaluate and implement cementing programs
* Design and implement bit and hydraulics programs
* Incorporate directional drilling and deviation control
* Recognize and evaluate well control problems

**COURSE CONTENT**

Planning including requirements for the completion and testing, AFE preparation • HSE at the rig site • Cost control, evaluating alternative drilling methods and maximizing penetration rate • Hole cleaning, sloughing shale, lost circulation, stuck pipe and fishing operations • Drilling fluids • Lifting capacity of drilling fluids, pressure losses in the circulating system and ECD • Maximizing hydraulics in the planning phase and at the rig • Bit selection and application • Casing and drill string design, selection of casing seats, BOP equipment • Cement, cement additives and displacement mechanisms • Deviation control, directional drilling and horizontal drilling • Pressure control, routine and special problems • Project post analysis
## Casing Design Workshop – CDW

### COURSE DESCRIPTION

**INTERMEDIATE**  
Casing design is an integral part of a drilling engineer’s work scope. This workshop provides a comprehensive overview of the design process, emphasizing the working stress approach currently used in the industry. Upon completion, participants will be able to select casing points, identify tubular requirements and loads, and design and specify the required casing string. Through a combination of lecture and extensive hands-on examples, the fundamentals of casing design are imparted to the attendees. Estimation of standard and special loads is covered in detail. Standard theories of strength and failure are discussed as well as advanced considerations for combined loads. In addition, safe handling, running, and hanging practices are covered. Participants will be furnished Dr. Byrom’s textbook, “Casing and Liners for Drilling and Completion,” and computer spreadsheets to facilitate routine design calculations.

### COURSE CONTENT

**Objectives of casing design** • Types of oilfield tubulars and connections • Casing point selection and size determination • Load estimation methods for casing and liners • Typical design factors • Theories of strength and failure (standard collapse, burst, axial; yield basis for combined loads) • Design examples and exercises for all key loads and strings • Casing handling, running, and hanging practices

**Design factors** • Theories of strength estimation methods for casing and liners • Selection and size determination • Tubular loads and connections • Casing point selection • Goals of casing design • Types of oilfield applications • Incorporate risk mitigation strategies into the casing design for the full life cycle of the well. Participants should have at least one year of drilling-related experience AND be in a role that requires that they perform a detailed casing design.

### BLENDED LEARNING WORKSHOP STRUCTURE

<table>
<thead>
<tr>
<th>Week</th>
<th>Hours (Approx)</th>
<th>Subject</th>
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<tbody>
<tr>
<td>1</td>
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<td>Opening Session: Overview</td>
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<tr>
<td>2</td>
<td>2.5</td>
<td>Introduction to Casing Design</td>
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<tr>
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<td>3</td>
<td>Select Casing Depth and Sizes</td>
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<tr>
<td>3</td>
<td>0.5</td>
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<tr>
<td>3</td>
<td>3</td>
<td>Calculate Collapse and Burst Loads</td>
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<tr>
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<td>Calculate Collapse and Burst Loads</td>
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<tr>
<td>3</td>
<td>3</td>
<td>Casing Load Determination</td>
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<td>Make Preliminary Casing Selection, Adjust for Axial Loads</td>
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<tr>
<td>3</td>
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<td>Make Preliminary Casing Selection, Adjust for Axial Loads</td>
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<tr>
<td>3</td>
<td>3</td>
<td>Casing Selection for Collapse, Burst, and Axial Design</td>
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<tr>
<td>4</td>
<td>4</td>
<td>Calculate Combined Load Effects, Adjust and Make Final Selection</td>
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<tr>
<td>3</td>
<td>1</td>
<td>Calculate Combined Load Effects, Adjust and Make Final Selection</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Final Casing Design with Combined Loads</td>
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<td>3</td>
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<td>Additional Load Considerations</td>
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<td>3</td>
<td>Workshop Wrap-up</td>
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<tr>
<td>5</td>
<td>2</td>
<td>Optional session - Creating Detailed Design for Portfolio Well</td>
</tr>
</tbody>
</table>

### Course Goals
- Incorporate well objectives and offset data to assure wellbore integrity through its life cycle
- Incorporate risk mitigation strategies into well design
- Apply alternative design approach to address unanticipated torque/drag forces, etc.
- Conduct pre-job safety analysis and identify potential well control trouble spots
- Walk through key equipment and hazards associated with running, landing and cementing casing

### Course Content
- Introduction to casing design
- Select casing depth and sizes
- Calculate collapse and burst loads
- Casing load determination
- Make preliminary casing selection, adjust for axial loads
- Casing selection for collapse, burst, and axial design
- Calculate combined load effects, adjust and make final selection

### Workshop Wrap-Up
- Additional load considerations
- Workshop wrap-up

### Virtual Schedule and Tuition (USD)

<table>
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<tr>
<th>2019 Schedule and Tuition (USD)</th>
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<tbody>
<tr>
<td><strong>HOUSTON, US</strong> 19-23 AUG</td>
</tr>
</tbody>
</table>

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### Offshore Drilling Operations – ODO

#### FOUNDATION 3-Day

This course is designed to familiarize personnel with unique aspects of offshore operations, structures, and vessels, and how drilling rigs interact with them over the life of an asset. All styles of rigs are analyzed, including bottom-supported and floating, mobile and fixed. Advantages and disadvantages of specific rig applications are considered when clarifying selection criteria, especially HSE performance, technical capabilities, and full-cycle efficiency.

### Designed For

Operator staff including engineering, geoscience, operations supervision and technical support, and HSE, drilling contractor rig crew and technical support personnel, and service company and logistics support personnel.

### You Will Learn How To
- Identify differences between onshore and offshore operations
- Clarify HSE and other risks associated with offshore operations (helicopter operations, boat operations, crane and deck operations, simultaneous operations, emergency response)
- Identify offshore structures commonly used in the oil and gas industry and their typical applications (bottom-supported or floating, fixed or mobile, moored or dynamically positioned, single use and multi-use structures)
- Identify various styles and designs of marine risers, subsea and surface BOPs, wellheads and trees
- Determine differences between various rig types and how they interact with offshore structures over the life of an asset (platform rigs, large rig, jackup rig, semi-submersible, drillship)
- Identify operational effectiveness differences between various configurations of rig equipment, especially multiple activity centers
- Specify rig selection criteria
- Clarify logistical drivers for drilling and completion operations

### Course Content

- Surface and subsurface characteristics unique to the offshore environment • HSE considerations for offshore and how it impacts planning, operations, and logistics • Design options for offshore and onshore installations (platforms; FPSOs, risers, and pipelines; wellheads and trees; shorebase; how these choices impact rig selection and project economics) • Drilling rig styles (design capabilities, advantages and disadvantages, rig selection criteria, multiple activity centers to compress the critical path, rig strategy) • Well construction sequences (surface and subsea wellheads, casing and cementing program strategies, drilling fluids selection, wellbore stability, NPT avoidance) • Transition to completion/intervention (barrier maintenance, job sequencing, intervention options)

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See website for dates and locations.
Cementing is a key factor in the well construction plan. The base cement used in the designing of cement slurries may or may not be API class cement. The operating company and the service company personnel should have a good working knowledge of cement slurry design, cement additives, and placement procedures. The majority of the operating companies do not have cement testing laboratories; therefore, the laboratory testing is conducted by service companies. This course is designed to give a good understanding of how the cement slurries are tested and under what conditions depending on given well parameters. This course will also cover casing hardware (both internal and external), cement blending, cement additive blending (dry and/or liquid), on-site mixing equipment and job execution on location.

**YOU WILL LEARN HOW TO**
- Design cement slurry using API and/or field adapted procedures and laboratory testing procedures
- Use cement additives in designing cement slurries to improve job success and/or reduce overall job costs
- Design cement jobs to include casing, multi-stage, liner, and tie-back strings
- Design and perform remedial (squeeze) cement jobs to include selection of tools
- Design cement slug slurries and selection of tools to improve overall job success

**COURSE CONTENT**
- Basic cements
- Cement additives
- Laboratory testing
- Casing hardware
- Blending equipment
- Mixing equipment
- Primary cementing
- Remedial cementing
- Plug cementing

**Stuck Pipe Prevention – Train Wreck Avoidance™ – SPP**

The Stuck Pipe Prevention Train Wreck Avoidance workshop provides the most comprehensive coverage in the industry for understanding and preventing the underlying causes of Stuck Pipe, Wellbore Instability, Loss Circulation, and other sources of non-productive time (NPT) in drilling operations. The workshop also focuses on correct responses by individuals and teams, early warning signs, and minimizing the impact to drilling operations. Through world-class presentations, practical discussion, and the best reference and instructional materials available, delegates hone their knowledge of basic drilling technology and how it relates to avoiding NPT.

**DESIGNED FOR**
Entire drilling and completions team, including operator, drilling contractor, and service companies. Agendas are typically customized to address topics relevant to the team.

**YOU WILL LEARN HOW TO**
- Identify mechanisms and risk factors that lead to stuck pipe incidents
- Anticipate, prevent, recognize, and resolve stuck pipe due to wellbore instability, hole cleaning, differential sticking, and wellbore geometry
- Assess mechanics of wellbore stresses and the impact on wellbore stability
- Analyze trends to identify early warning signs of developing wellbore problems
- Use hole cleaning factors in both vertical and deviated wellbores
- Apply mechanics of jars and how to use them effectively
- Implement effective drilling and tripping practices
- Make cost-effective choices in planning fishing operations

**COURSE CONTENT**
- Stuck Pipe Prevention
- Rock mechanics
- Wellbore stress
- Wellbore instability
- Trend recognition
- Hole cleaning
- Differential sticking
- Wellbore geometry
- Tripping practices
- Fishing practices

**Cementing Practices – Cementing II – CEP**

Cementing is a very important phase of the well construction plan. Operating company personnel must have a good working knowledge of cements, cementing additives, and placement procedures. The use of temperature modeling, computer programs used for job design, and placement of the cement has caused some operating companies to retain a cement service company representative on a full-time basis to assist in the overall cementing operations. The operator is critical to the success of the job. This course covers the importance of the cement sheath integrity during the life of the well, which will require additional mechanical properties of the cement sheath than just the unconfined compressive strength in many cases. The parameters that the cement sheath will be subjected to must be considered. There are a number of joint industry projects addressing this area of work. The course covers the use of cement formulations, cement additives, casing hardware, cement blending, on-site mixing equipment, and a well-planned job procedure. Cementing guidelines that aid in overall job performance will be covered.

**DESIGNED FOR**
Entire drilling and completions team, including operator, drilling contractor, and service companies personnel responsible for planning, laboratory testing, overseeing, and executing cementing operations.

**YOU WILL LEARN HOW TO**
- Use cementing additives properly to improve and reduce job costs
- Interpret laboratory test results
- Perform primary cementing operations to include: casing cementing, liner cementing, multi-stage cementing
- Conduct squeeze jobs and selection of squeeze tools
- Perform cement plug operations to improve overall job success
- Interpret cement sheath evaluation logs

**COURSE CONTENT**
- Stuck Pipe Prevention
- Rock mechanics
- Wellbore stress
- Wellbore instability
- Trend recognition
- Hole cleaning
- Differential sticking
- Wellbore geometry
- Tripping practices
- Fishing practices

**Deepwater Well Engineering – DWE**

This is a five-day course designed to promote understanding of well design and engineering capabilities unique to the deep water environment. Participants are actively engaged in the skills and activities required to deliver a cost-effective well plan, while also gaining valuable perspective on the role of a DW drilling engineer as a project manager. Suggested course prerequisites include 3+ years’ experience in drilling and 2+ years in a well planning role for onshore or shallow water applications.

**DESIGNED FOR**
Experienced drilling engineers, drilling supervisors, and other petroleum professionals that are new to deep water (DW) who will become involved or responsible for DW well planning or oversight of non-operated DW wells. The ten-day, Deepwater Engineering (DWE) course, or its equivalent, is highly recommended as a pre-requisite.

**YOU WILL LEARN HOW TO**
- Understand and manage technologies, practices, and design methodologies unique to the DW environment
- Analyze and utilize offset well data important for DW planning and well design
- Identify key issues and risks related to floating operations and rigselection
- Manage challenging logistics and unique equipment/supply chain issues
- Clarify the potential impact of geohazards, such as shallow gas and water flows, hydrates, salt, and tar
- Identify well control calculations and corrective kick tolerances
- Develop specific casing design skills, including impact of metocean environmental conditions on structural pipe design, casing point selection, annular pressure build-up design strategies, and use of US GOM Well Containment Screening Tool
- Assess DW cementing technologies and make appropriate choices for a DW well
- Develop designs for DW drill strings, BHA’s, and landing strings
- Clarify well design issues for both riserless and post-riser phases of well construction
- Define drilling fluids for a DW well; assess and address any unique issues
- Compile risks to well delivery; develop mitigations and contingency plans
- Consider abandonment requirements in well design

**COURSE CONTENT**
- Floating drilling rigs and equipment
- Unique challenges of deepwater
- Shallow hazards
- Deepwater planning cycle
- Subsea BOP equipment
- Subsea well control issues
- Structural pipe design for bending
- Riserless drilling
- Casing shoe depth considerations in DW
- Annular pressure buildup in casing strings
- Regulatory requirements
- Subsea cementing process
- Subsea wellheads and trees
- Hydrates
- Drilling fluid issues in DW
- Slip crushing for drilling design
- Landing string design
- Salt drilling
- Relief well planning for DW
- DW risks
- Abandonment of subsea wells
- Awareness of the basics of Managed Pressure Drilling and other emerging technologies
**Directional, Horizontal, and Multilateral Drilling**

- **DHD**

**INTERMEDIATE 5-Day**

This course builds a firm foundation in the principles and practices of directional drilling, calculations, and planning for directional and horizontal wells. Specific problems associated with directional and horizontal drilling such as torque, drag, hole cleaning, logging, and drill string component design are included. Participants will receive instruction on planning and evaluating horizontal wells based on the objectives of the horizontal well. The basic applications and techniques for multi-lateral wells are covered in the course. Additionally, they will become familiar with the tools and techniques used in directional drilling such as survey instruments, bottomhole assemblies, motors, steerable motors, and steerable rotary systems. Participants will be able to predict wellbore path based on historical data and determine the requirements to hit the target.

**DESIGNED FOR**

Drilling, production and operations engineers, field supervisors, toolpushers, managers, and technical support personnel.

**YOU WILL LEARN HOW TO**

- Make survey calculations
- Interpret TVD, polar and rectangular coordinates, and vertical section
- Interpret dogleg severity and the problems associated with dogleg severity
- Plan a two-dimensional directional well
- Plan horizontal wells based on the objectives of the well
- Determine the best multi-lateral completion for an application
- Determine declination and non-magnetic drilling collar selection
- Apply the best survey instrument for the job
- Directionally drill with rotary BHA's, jetting, whipstocks, motor, steerable motors, and rotary steerable systems
- Drill horizontally underbalanced
- Interpret torque and drag and determine what factors will affect the torque and drag
- Determine cementing requirements for directional wells

**COURSE CONTENT**

Applications for directional drilling • Directional profiles • Extended reach wells • Survey calculations and accuracy • Dogleg severity calculations and problems associated with doglegs • Planning directional and horizontal wells • Horizontal drilling methods and applications • Logging high angle wells • Hole cleaning • Multi-laterals • Types of survey instruments • Tools used to deflect a wellbore • Torque and drag calculations • Cementing

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**Drill String Design and Optimization**

- **DSD**

**INTERMEDIATE 5-Day**

We have been presenting Drill String Design workshops for over 12 years for all types of operations around the world. We are constantly updating our materials to reflect the latest technology applications for both near-vertical and high-angle wells while maintaining a thorough grounding in the fundamentals. Workshop content is often customized to address customer-specific operational situations and software applications. Course tuition includes a copy of DS-1 Drill String Design Standard 4th Ed. Vol.2.

**DESIGNED FOR**

Operator, drilling contractor, and service company engineers; drilling supervisors and superintendents. This is an intensive technical workshop. A calculator is required and a laptop is strongly recommended. Class size is typically limited to 18-20.

**YOU WILL LEARN HOW TO**

- Place the drill string design process in context with other planning and operational considerations
- Refresh underlying physics of drill string failures and mechanical properties of drill string materials
- Clarify performance properties of drill string components and how to apply design margins
- Design cost-effective BHA's and match them to your bit
- Gain specific application experience analyzing common load cases for both near-vertical and high-angle situations: tension loads, torque loads, combined tension-torque loads, fatigue loads, buckling loads
- Understand the basis for industry software design tools, including torque and drag, casing wear, and hydraulics
- Identify drilling tools and operational practices to reduce both torque and drag and casing wear
- Diagnose and mitigate vibration to reduce drill string damage and failure
- Optimize your drill string inspection program using the latest industry standards

**COURSE CONTENT**

Drill string and BHA failure prevention • Low-angle design applications • High-angle design applications • Torque, drag, and casing wear mitigation • Vibration monitoring and avoidance • Drill string handling and inspection

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**Managing Wellsite Operations**

- **MWC**

**INTERMEDIATE 5-Day**

Managing Wellsite Operations is an interactive course that teaches participants to successfully manage wellsite operational plans, resource management, and control measures. Interpersonal skills associated with the art of managing the Jowari window through active listening and conducting crucial conversations is exercised throughout the course. This course brings together documented case histories of complex well operations and techniques to manage associated human factors. Participants will learn to build effective teams by assuming roles in class exercises of the company representative, rig contractor, and supplier personnel. Critical issues are identified to improve safety and reduce trouble time. Improving the facilitation of wellsite action planning, rig instructions, and work processes is exercised to improve operator, contractor, and service provider performance metrics.

**DESIGNED FOR**

Drilling and completion well supervisors, wellsite engineers, superintendents, operations managers, senior drilling contractor, and wellsite service personnel.

**YOU WILL LEARN HOW TO**

- Manage key relationships between surface – subsurface parts of the well program
- Manage technical and interpersonal skills associated with complex operations
- Manage self and rig team situational awareness and competencies
- Manage communications to improve wellsites performance and build effective rig teams
- Manage the well monitoring program to reduce lost time risks

**COURSE CONTENT**

Rig team priorities and success measures • Focusing on wellsite challenges, distractions, and sensibilities • Managing reports and rig documentation • Rig meetings and drills • Well monitoring, limits, alarms, and suspension of operations • Reducing unscheduled events, technical limits, and drilling/completing well on paper techniques • Managing complex situations associated with tripping, displacements, and testing

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**Practical Drilling Skills**

- **PDS**

**INTERMEDIATE 5-Day**

This course teaches how to listen to the well, perform simple tests on the rig, and make proper decisions unique to each well. The intent is to eliminate visible and invisible Non-Productive Time (NPT). Visible NPT includes stuck pipe, conditioning drilling fluid, lost circulation, etc. Invisible NPT is often far more expensive and includes drilling much slower than is possible, wearing out the bits prematurely, and bad cement barriers. Considerable attention is devoted to correcting drilling fluid properties and controlling filter cake quality. This eliminates many seen and unseen obstacles for drilling a trouble-free hole as cheaply as possible. This involves proper drilling fluid processing in the surface tanks. No discussion will be presented of fishing tools, they should rarely be needed after this course. Bring a calculator, you will need it.

**DESIGNED FOR**

Experienced people on drilling rigs who want to drill cheaper, specifically drilling rig personnel, drilling engineers, rig supervisors, tool pushers, drilling managers, and service company personnel. This course is NOT recommended for inexperienced personnel or people not directly involved with actual drilling operations. You should have completed the Basic Drilling Technology course or have several years of drilling experience to gain the most from the course.

**YOU WILL LEARN HOW TO**

- Calibrate a must fitter's gas unit curve
- Interprete gas unit curves
- Deterime pore pressure
- Select the correct nozzle sizes and flow rate to make the fluid strike the bottom of the hole with the greatest force possible or the greatest power available
- Select drilling fluid yield point needed to clean the vertical portion of the well
- Extend the life of drill bits and have the maximum drilling rate by determining the flounder point of a roller cone or PDC bit
- Avoid poor cementing jobs by creating a thin, slick, compressible filter cake
- Decrease vibration which seriously impacts PDC bit performance by eliminating drilled solids
- Arrange equipment for a proper PIT
- Read Pressure Integrity charts
- Evaluate drill bits to select the best next bit
- Understand well bore instability

**COURSE CONTENT**

Interpretation of mud logger gas units • Determining pore pressure • On-site hydraulic optimization • Selecting proper bit loading (weight on bit and rotary speed) for the fastest, cheapest hole • Interpreting pressure integrity tests • Hole problems (such as, stuck pipe, lost circulation, and ballooning) • Borehole stability • Operating guidelines • Drilling fluid properties necessary to maximize drilling performance • Discussion of polymers in drilling fluids • Solids control equipment arrangement to assure best drilled solids removal

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**2019 Schedule and Tuition (USD)**

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<tr>
<th>Location</th>
<th>Dates</th>
<th>Tuition</th>
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</tbody>
</table>

See website for dates and locations.

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

Any course is available inhouse at your location. Contact us today.
Explore the Unconventional.

**Solids Control Systems**

**SCS**

**SPECIALIZED** 5-Day

Drilling fluids containing too many drilled solids increase trouble costs or visible and invisible Non-Productive Time (NPT). Invisible NPT relates to drilling performance, excessive volumes of drilling fluid, as well as cementing problems and barrier failure.

All drilling fluid surface treatment systems should have three identifiable sections: Suction, Addition, and Removal. The suction section must blend the fluid so that the mud weight in the drill pipe is the same from top to bottom for reliable well control. Tank volumes, agitation, mud guns, and additional procedures are discussed to ensure a homogenous fluid.

Drilled solids are easier to remove when they are large. Solids control starts with cuttings removal at the drill bit to eliminate regrinding and reduced drilling rate. Removal of drilled solids requires an understanding of the performance of shale shakers, hydrocyclones, mud cleaners, and centrifuges.

Analysis procedures applicable for all drilling rigs, large and small, as well as any drilling fluid, will be discussed. Procedures will be presented to determine the optimum drilled solids removal efficiency for each target drilled solids concentration.

**DESIGNED FOR**

Only people interested in eliminating non-productive time while drilling, such as: drilling engineers, drilling rig supervisors, tool pushers, drilling managers, operating company personnel and reservoir engineers.

**YOU WILL LEARN HOW TO**

- Evaluate the effect of drilled solids on the total cost of a well
- Remove drilled solids expeditiously from beneath the drill bit
- Transport drilled solids to the surface
- Arrange each component of a drilling fluid processing plant for proper performance
- Determine the Equipment Solids Removal Efficiency of the system
- Understand the new API RP 13C (Solids Control)
- Evaluate the effect of drilled solids on drilling fluid properties
- Minimize drilling fluid discarded

**COURSE CONTENT**

Analysis of different aspects of drilling affected by drilled solids: • Solids transport capabilities of a drilling fluid • How shale shakers separate drilled solids • The new API shaker screen designation and how it works • Types of motion of shale shakers, hydrocyclones and centrifuges separate drilled solids • How equipment should be arranged on a drilling fluid processing plant • Selecting the proper centrifugal pump impeller • Mud tank agitation • Mud gun placement • Degasser operation and objective • Guidelines for effective drilled solids removal • Trip tank operation • Calculating Solids Removal Efficiency • Evaluating mud cake compressibility • Developing a thin, slick compressible filter cake in a well bore, maintaining a homogenous fluid to fill drill pipe

**FOR MORE INFORMATION ON THESE PROGRAMS,**
**VISIT US AT www.petroskills.com/unconventional**
Introduction to Data Management – IDM

BASIC  2-Day

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

DESIGNED FOR

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

YOU WILL LEARN

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

COURSE CONTENT

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

Self-paced, virtual course
- start anytime.

FOR MORE INFORMATION, VISIT PETROSKILLS.COM/BPTONLINE

See website for dates and locations.
Basic Drilling, Completion and Workover Operations – BDC

5-Day

This course presents the basics of drilling and completion operations, plus post-completion enhancement (workover). 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.

DESIGNED FOR

Technical, field, service, support, and supervisory personnel desiring to gain an awareness of wellbore operations. Excellent for cross-training of other technical disciplines such as reservoir and facility engineers, geoscientists, supervisors, service personnel, and anyone who interacts with drilling, completion or workover engineers.

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 • Drilling rig components and accessories • Drilling fluids and hydraulics • Hole problems, stuck pipe, side-tracking and fishing • Cores and coring • Electric logging, MWI, LTD; Casing design and installation • Primary and remedial cementing • Directional, horizontal, multilateral and under-balanced drilling • Wellhead equipment and tree • 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, acidizing, hydraulic fracturing • Formation and sand control • Mechanical retention, chemical consolidation, and gravel packing • and more...

BDC is also available as a self-paced, virtual course which is an enhanced version of the face-to-face public session. VIRTUAL DELIVERY $3930

PETROSKILLS.COM/BDCONLINE

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Evaluating and Developing Shale Resources – SRE

5-Day

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

DESIGNED FOR

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

YOU WILL LEARN HOW TO

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

COURSE CONTENT

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

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Basic Petroleum Geology – BG

5-Day

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

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 • Geologic time • Weathering and erosion • Deposition • Diagenesis • Reservoirs • Structural geology and petroleum • Origin, migration, and trapping of petroleum

Basic Reservoir Engineering – BR

5-Day

This course is designed to help the participants develop a more complete understanding of the characteristics of oil and gas reservoirs, from fluid and rock characteristics through reservoir definition, classification, development, and production. Data collection, integration, and application directed toward maximizing recovery and Net Present Value are stressed. Basic reservoir engineering equations are introduced with emphasis directed to parameter significance and an understanding of the results.

DESIGNED FOR

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

YOU WILL LEARN

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

COURSE CONTENT

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

PETROSKILLS.COM/BR-BLENDED

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2019 Schedule and Tuition (USD)

BOKERSFIELD, US 12-17 MAY $4170
CALGARY, CAN 23-27 SEPT $4170+GST
DALLAS, US 14-19 JUNE $4170
DENVER, US 8-12 JULY $4220
HOUSTON, US 8-12 AUG $4225
20-24 AUG $4225
9-13 DEC $4225
KUALA LUMPUR, MY, 21-25 OCT $5120
LONDON, UK 12-16 AUG $4035+VAT

2019 Schedule and Tuition (USD)

DENVER, US 11-15 NOV $4320
HOUSTON, US 12-16 AUG $4325
LONDON, UK 6-10 JUNE $5035+VAT
MIAMI, USA 10-14 JUNE $4270
PITTSBURGH, USA 29 APR-3 MAY $4320

2019 Schedule and Tuition (USD)

HOUSTON, US 13-17 MAY $4335
LONDON, UK 7-11 OCT $5045+VAT

* plus computer charge

2019 Schedule and Tuition (USD)

ABERDEEN, UK 9-13 DEC $4035+VAT
ABU DHABI, UAE 6-10 OCT $5335+VAT
BOKERSFIELD, US 18-22 AUG $4170
DENVER, US 29 APR-3 MAY $4220
HOUSTON, US 18-22 FEB $4225
17-21 JUNE $4225
2-6 DEC $4225
LONDON, UK 20-24 MAY $4935+VAT

All classes available at your location. Contact us today.
CROSS-TRAINING

Foundations of Petrophysics – FPP

FOUNDATION 5-Day

Petrophysics is fundamental to all aspects of the petroleum business. Principles, applications, and integration of petrophysical information for reservoir description will be discussed in 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’ abilities to assess technical risk when examining hydrocarbon opportunities.

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 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, radioactive, acoustic tools. (LWD/MWD or open hole logging • Determination of rock types using core and logs • Petrophysical impact on economic uncertainty • Evolving petrophysical technologies • Overview of cased hole logging

FPP is also available as a self-paced, virtual course which is an enhanced version of the face-to-face public session. VIRTUAL DELIVERY $4325 PETROSKILLS.COM/FFPONLINE

2019 Schedule and Tuition (USD)

HOUSTON, US
18-22 MAR $4390
30 SEP-4 OCT $4325
KUALA LUMPUR, MYS
21-25 OCT $5280
LONDON, UK
2-6 DEC $5700 + VAT

HOUSTON, US
25-29 NOV $5245
KUALA LUMPUR, MYS
25-29 NOV $5245

Mudlogging – MDLG

FOUNDATION 5-Day

Mud logging, also known as surface logging, is the creation of a detailed record of a borehole by examining the bits of rock or sediment brought to the surface by the circulating drilling medium (most commonly mud). Mud logging is usually performed by a third-party mud logging company. This provides well owners and producers with information about the lithology and fluid content of the borehole while drilling. Historically it is the earliest type of well log.

DESIGNED FOR

New hire geologists and geophysicists; and reservoir, petroleum, and drilling engineers.

YOU WILL LEARN HOW TO

• Make well to well correlation
• Understand mud logging equipment
• Calculate the lag time and advanced volumes calculations
• Describe the formation cuttings
• Integrate the cuttings evaluation with the drilling parameters
• Interpret all the acquired geological and engineering data at the rig site
• Evaluate the hydrocarbon potential of the formation
• Deal with drilling mud rheology and hydraulics
• Handle, process and describe cores
• Evaluate different types of pressure
• Handle formation pressure to minimize borehole risks

COURSE CONTENT

Introduction • Petroleum geology • Rig types and their components • Drilling and completing a well • Sampling and cuttings analysis • Volume calculations • Advanced sample evaluation • Formation pressures • Borehole problems

2019 Schedule and Tuition (USD)

HOUSTON, US
18-20 NOV $3365
KUALA LUMPUR, MYS
25-29 NOV $5245
LONDON, UK
2-6 DEC $5700 + VAT

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 mechanics of rocks
• Apply rock mechanics concepts and generate economic benefits in all phases of reservoir development

COURSE CONTENT

Introduction to rock mechanics and geomechanical principals • 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 • Elastic, plastic, and viscous models of rock behavior • Borehole stability • Sand control • Fracture mechanics • Unconventional reservoir applications • Reservoir engineering applications • Wireline log predicted mechanical properties • Data integration

2019 Schedule and Tuition (USD)

HOUSTON, US
20-24 MAY $4325
KUALA LUMPUR, MYS
27-31 MAY $5900
THE HAGUE, NLD
22-26 JUN $5900

Production Technology for Other Disciplines – PTO

FOUNDATION 5-Day

PTO is an asset team course, as it introduces a broad array of important daily Production Technology practices. Terminologies, expressions, axioms, and basic calculations regularly utilized by production technicians are covered. Emphasis is upon proven technology required to effectively develop and operate an asset in a multidiscipline development environment. Practical application of technology is emphasized. Nodal analysis examples to assess well performance are set up. Well completion equipment and tools are viewed and discussed. Exercises include, basic artificial lift designs, acidizing programs, gravel pack designs, and fracturing programs. Shale gas and oil development challenges are thoroughly explained. Horizontal and multilateral technology is presented.

DESIGNED FOR

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

YOU WILL LEARN HOW TO

• Apply and integrate production technology principles for oilfield project development
• Choose basic well completion equipment configurations
• Perform system analyses (Nodal Analysis™) to optimize well tubing design and selection
• Perform basic artificial lift designs
• Apply the latest shale gas and oil extraction technologies
• Understand the chemistry and execution of sandstone and carbonate acid jobs
• Design sand control gravel pack completions
• Evaluate 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 • Complete design • Infow and outflow performance • Artificial lift well completion systems (beam pump, gas-lift, ESP, PCP, plunger lift) • Formation damage and well acidizing • Perforating practices • Sand control • Hydraulic fracturing • Shale gas and oil development

2019 Schedule and Tuition (USD)

HOUSTON, US
19-23 AUG $4325
KUALA LUMPUR, MYS
25-29 NOV $5900
THE HAGUE, NLD
22-26 JUN $5900

* plus computer charge

PETROSKILLS.COM/VIRTUAL-PTO
**Production Operations 1 – PO1**

**FOUNDATION**
PO1 represents the core foundation course of PetroSkills’ production engineering curriculum and is the basis for future oilfield operations studies. Course participants will become familiar with both proven historical production practices as well as current technological advances to maximize oil and gas production and overall resource recovery. The course structure and pace apply a logical approach to learn safe, least cost, integrated analytical skills to successfully define and manage oil and gas operations. Applied skills guide the participant with a framework to make careful, prudent, technical oil and gas business decisions. Currently emerging practices in the exploitation of unconventional resources including shale gas and oil, and heavy oil and bitumen complement broad, specific coverage of conventional resource extraction.

**DESIGNED FOR**
Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers, and especially engineers starting a work assignment in production engineering and operations or other engineers seeking a well-rounded foundation in production engineering.

**YOU WILL LEARN HOW TO**
- Recognize geological models to identify conventional and unconventional (shale oil and gas and heavy oil) hydrocarbon accumulations
- Understand key principles and parameters of well inflows and outflows
- Build accurate nodal analysis models for tubing size selection and problem well review
- Design and select well completion tubing, packer, and other downhole equipment tools
- Plan advanced well completion types such as multilateral, extended length, and intelligent wells
- Design both conventional and unconventional multi stage fractured horizontal wells
- Apply successful primary casing cementing and remedial repair techniques
- Select equipment and apply practices for perforating operations
- Plan well intervention jobs using wireline, snubbing, and coiled tubing methods
- Manage corrosion, erosion, soluble and insoluble scales, and produced water handling challenges
- Apply well completion and workover fluid specifications for solids control and filtration
- Employ the five main types of artificial lift systems
- Identify formation damage and apply remedial procedures
- Design and execute successful carbonate and sandstone reservoir acidizing programs
- Understand the causes of sand production and how to select sand control options
- Understand the proper use of oilfield surfactants and related production chemistry
- Identify and successfully manage organic paraffin and asphaltene deposits
- Choose cased hole production logging tools and interpret logging results
- Understand modern conventional fracture stimulation practices
- Understand multistage, horizontal well shale gas and shale oil massive frac job design and operations
- Review heavy oil development and extraction including mining operations and current modern thermal processes

**COURSE CONTENT**
Importance of the geological model • Reservoir engineering fundamentals in production operations • Understanding inflow and outflow and applied system analysis • Well testing methods applicable to production operations • Well completion design and related equipment • Primary and remedial cementing operations • Perforating design and applications • Completion and workover well fluids • Well intervention: wireline, hydraulic workover units, and coiled tubing • Production logging • Artificial lift completions: rod pump, gas lift, ESP, PCP, plunger lift, and others • Problem well analysis • and more...

**2019 Schedule and Tuition (USD)**

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<td>7-11 OCT, 21-25 OCT</td>
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<td>MIDLAND, US</td>
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*plus computer charge

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

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<tr>
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**PetroSkills.COM/PO1-BLENDEDCAW**

**Completions and Workovers – CAW**

**FOUNDATION**
An integrated introduction to many facets of completion and intervention technology. The material progresses through each of the major design, diagnostic, and intervention technologies concluding with some common remedial measures and well abandonment. The course focuses on the practical aspects of each of the technologies, using design examples - successes and failures - to illustrate the key points of the design and the risks/uncertainties. The overall objectives of the course focus on delivering and maintaining well quality.

**DESIGNED FOR**
Graduates or engineers with experience, engaged in drilling operations, production operations, workover, and completions; petroleum engineering in both the service and operating sectors

**YOU WILL LEARN HOW TO**
- Develop a high level completion strategy for wells in a variety of situations
- Select tubing, packers, and completion flow control equipment
- Appraise/design a flow barrier strategy
- Identify key design considerations for vertical and inclined wells, horizontal, multilateral, HPHT, and unconventional resource wells
- Select intervention strategy/equipment
- Identify key features/capability of the main sand control and well stimulation options
- Assess/specify concerns/remedial measures for formation damage/skin removal

**COURSE CONTENT**
Basic well completion design, practices, and strategies • Well quality and integrity • Safety aspects of well design • Wellheads, trees, subsurface safety valves, and flow control equipment • Material selection guidelines based on corrosion and erosion conditions • Interpretation of inflow and tubing performance to aid tubing size selection • Tubing design and selection • Considerations for designing deviated horizontal, multilateral, and multi zone reservoir completions • Basic completion principles and considerations for subsea, HPHT, and unconventional wells • Perforating job selection and design • Formation damage mechanisms and remediation • Stimulation design considerations • Sand control options and their selection • Wireline, coiled tubing, and hydraulic workover rig operations • Snubbing
Formation Damage: Causes, Prevention, and Remediation – FD

INTERMEDIATE 5-Day

Formation damage seems to be inevitable and it is costing your company money! Whether formation damage can be prevented, removed economically, or must be accepted as the price for drilling and producing a well will depend upon many factors. Concerns for formation damage have been with our industry from the early days. These concerns become more prevalent as we embark on more challenging reservoirs utilizing advanced horizontal drilling, completion, and production methods. Additional concerns relate to the common lost production or injectivity following workovers in these challenging environments. These subjects and many more are addressed in this fast-paced, informative course covering all aspects of formation damage. Examples, case histories, and class team exercises are used throughout the course to emphasize key points on this important industry subject. This subject is briefly covered in the PetroSkills Production Operations 1 course (Foundation Level) as well as in the Well-Stimulation: Practical and Applied (Basic Level) course. However, this course is more concentrated, detailed, and applied in the subject matter than either of the other courses.

DESIGNED FOR

Production, completion, reservoir, and drilling engineers; geologists concerned with well performance and production enhancement; field supervisors, production foremen, engineering technicians, production and exploration managers; those involved in vertical, horizontal, and multilateral wells, conventional and unconventional reservoirs.

YOU WILL LEARN HOW TO

• Recognize formation damage and damage mechanisms in carbonates, sandstones, and shales
• Prevent and overcome damage, when it exists, through the application of non-acid approaches, acidizing, and small fracturing treatments

COURSE CONTENT

Geological depositional environment, reservoir properties review • Properties influencing formation damage • Damaging sandstones, shales and carbonates, clay mineralogy • Damage mechanisms and causes of damage: fluids and polymers, during drilling, running pipe and cementing, from perforating, during well completions, during production (lines migration, paraffin, scale, etc.), during workovers, and damage to injection wells • Evaluating damage potential: laboratory evaluation • Evaluating wells that may be damaged: production performance, pressure analysis, production logging • Damage removal: non-acid approaches, acidizing, and bypassing damage with hydraulic fracturing

Horizontal and Multilaterals Wells: Completions and Stimulation – HML2

SPECIALIZED 5-Day

Successful multilateral and horizontal wells require new considerations, interdisciplinary planning, and special techniques. This intense course addresses the critical need for a proper understanding of all aspects of horizontal and multilateral design, completion, and stimulation that make these wells unique. It is designed for those planning or working with horizontal and multilateral wells and interested in effective use of the latest technology. Basic understanding of important reservoir characteristics, hole stability, formation damage, crucial zone isolation, and hydraulic fracturing are just some of the critical issues addressed by this course. Hydraulic fracturing aspects of unconventional resources play, including conductivity, proppant selection, and practices, are discussed. A combined practical and technical theme is employed, with emphasis on economy and efficiency in designing, completing, and producing horizontal and multilateral wells.

DESIGNED FOR

Completion, production, reservoir, and research engineers; geologists; managers in completion, production, drilling, and exploration; others involved in various phases of horizontal and multilateral wells or interested in gaining an interdisciplinary up-to-date understanding of this continually evolving technology.

YOU WILL LEARN HOW TO

• Successfully design and optimize horizontal and multilateral well completions
• Engineer wells, taking into account limitations imposed by well bore stability and borehole friction
• Determine the appropriate isolation methods for horizontal and multilateral wells
• Perform hydraulic fracturing of horizontal wells
• Design damage removal, stimulation, and workover operations

COURSE CONTENT

Reservoir characteristics for horizontal and multilateral well applications • Well performance prediction • Wellbore stability of horizontal wells • Stress field effect on drilling, completion, production, and stimulation • Geosteering • Multilateral well structure, junction, and application • Formation damage and its effect on horizontal well performance • Well completion and its effect on horizontal and multilateral wells • Intelligent completion: downhole monitoring and control • Well trajectory and completion optimization • Horizontal well fracturing • Acidizing of horizontal wells • Other stimulation methods

Basic Petroleum Economics – BEC3

BASIC 3-Day

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 effecting oil and gas prices • Cash flow techniques • Economic criteria: interest, hurdle rate, time value of money, selection, ranking criteria • Risk: uncertainty: types of risk, mathematical techniques, probabilistic models, uncertainty in economic analysis • Tips on economic factors in computer spreadsheet analysis • Ethics in economic analyses

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 so they can actively participate in multi-discipline evaluation teams. The focus is on designing and solving decision models. About half the problems relate to exploration. The methods utilize probability, risk management, and all capital investment decisions. Probability distributions express professional judgments about risks and uncertainties and are carried through the calculations. Decision tree and influence diagrams provide clear communications and the basis for valuing each alternative. The complimentary Monte Carlo simulation technique is experienced in detail in a hand-calculation exercise. Project modeling fundamentals and basic probability concepts provide the foundation for the calculations. The mathematics is straightforward and mostly involves only common algebra. This is a fast-paced course and recommended for those with strong English listening skills. This course is intended as the prerequisite for the Advanced Decision Analysis with Portfolio and Project Modeling course.

DESIGNED FOR

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

YOU WILL LEARN HOW TO

• Describe the elements of the decision analysis process and the respective roles of management and the analysis team
• Express and interpret judgments about risks and uncertainties as probability distributions and popular statistics
• Represent discrete random 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 opportunities using 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 (the easy way), calibration and eliciting judgments, choosing distribution types, common misconceptions about probability • Evaluating a multi-play prospect (team exercise), and more

2019 Schedule and Tuition (USD)

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2019 Schedule and Tuition (USD)

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All classes available at your location. Contact us today.
### 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 organization
- Identify and integrate key tools associated with Occupational Health and Safety (OHS) 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**

- Context of the organization • Leadership and commitment • Environmental policy • Roles, responsibilities, and authorities • Actions to address risks and opportunities (aspects, compliance, objectives) • Resources, competence, awareness, communication, documentation • Operational planning and control • Emergency preparedness and response • Monitoring, measurement, analysis, and evaluation • Internal audit • Management review • Improvement

**2019 Schedule and Tuition (USD)**

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### Applied Occupational Health and Safety Management Systems – HSM

**FOUNDATION 5-Day**

Every 15 seconds, somewhere in the world, a worker is killed and over 150 others are injured. Our members’ and clients’ experience is that committed application of an Occupational Health and Safety Management System (OHSMS) can reduce such incidents, while providing a platform for sustained cultural change. We call this ‘predict and prevent’ instead of the unstructured approach of ‘react and remedy.’ Participants will receive a template OHS & MS manual for their own use as part of the study materials. This class provides a complete review of the new international standard for occupational health and safety management, ISO 45001:2018 as well as an overview of other common OH&S-M & OHSAS, ILO OSH-2001, ILOP HSE-MS that can be aligned to organizations’ own systems. Over five days, the class works through a Plan, Do, Check, Act improvement cycle 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**

Health and Safety (H&S) professionals who want to take advantage of the new improvement opportunities presented by ISO 45001 (or seek external certification), project managers, contract managers, members of H&S committees, directors of smaller organisations with limited access to specialist H&S advice.

**YOU WILL LEARN HOW TO**

- Successfully design and use the principle elements of an OHS-MS in a typical petrochemical organisation
- Identify and integrate key tools associated with OHS management, including HazID, risk assessment, JSA, PTW, LOTO, active and reactive monitoring
- Reflect on, shape and initiate improvements in the safety culture of an organization
- Communicate a powerful improvement message to a team of senior leaders

**COURSE CONTENT**

- Context of the organization • Leadership and commitment • OHS 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

**2019 Schedule and Tuition (USD)**

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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
Exploitation 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 (PMI2) and Project Management for Upstream Field Development (PM2) 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

Essential Leadership Skills for Technical Professionals – OMI2

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

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

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

Essential Technical Writing Skills – ETWS

BASIC 3-Day

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

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

YOU WILL LEARN HOW TO
• To focus on the reader as the receiver of the information
• To develop quality writing that will: Improve business relationships and communication Enable you to write better and faster Make your writing more credible Make you more confident in your writing

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

Team Leadership – TLS

FOUNDATION 2-Day

This program will develop and refine the skills essential for leading a high performance team. Emphasis is placed on the leader’s role in effectively enhancing total team functionality and maximum team productivity. Individual communication styles will be assessed and examined to identify the most appropriate communication style to use with your team. This will be an active experience. In addition to receiving individual assessment information, participants will be exposed to team concepts, theories, and skill development through the use of lectures, videos, readings, role plays, case studies, and discussions. This course has been constructed to maximize opportunity to improve both knowledge and practical skills in leading a team and being a team player. (This is a great course to attend immediately following PetroSkills’ course titled: Leading and Managing Others.) In addition to this program designed specifically for Team Leaders, PetroSkills has a 2-day course titled: Team Building for In-plant 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 responsibilities
• Understand system influence
• Promote conditions for effective team building
• Conduct individual and team assessments
• Improve team communications
• Improve group dynamics
• Develop personal plans to improve team effectiveness
• Foster team leadership
• Monitor team progress

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

2019 Schedule and Tuition (USD)

HOUSTON, US 4-8 NOV $4425
KUALA LUMPUR, MY 17-21 JUNE $5320
LONDON, UK 2-6 SEP $3135 + VAT

2019 Schedule and Tuition (USD)

DENVER, US 16-20 SEP $4220
HOUSTON, US 22-26 APR $4225
ORLANDO, US 2-6 DEC $4270

* plus computer charge

See website for dates and locations.

2019 Schedule and Tuition (USD)

HOUSTON, US 9-10 MAY $2595

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- Production and Completions Engineering
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- Process Facilities
- Offshore & Subsea
- Pipeline Engineering
- Instrumentation, Controls & Electrical
- Mechanical Engineering
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#### Operations & Maintenance

#### Health, Safety, Environment

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

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

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- Eliminated travel expense
- Flexibility—less time away from work
- Learning applied at point of need

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

For more information, please visit petroskills.com/blended