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<tr>
<td><strong>LNG Short Course:</strong></td>
<td><strong>Fundamental and Practical Aspects of Produced Water Treating – PF23</strong></td>
<td><strong>Gas Treating and Sulfur Recovery – G6</strong></td>
<td><strong>CO₂ Surface Facilities – PF81</strong></td>
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<td><strong>Overview of Gas Processing – G2</strong></td>
<td><strong>Applied Water Technology in Oil and Gas Production – PF21</strong></td>
<td><strong>Practical Computer Simulation Applications in Gas Processing – G5</strong></td>
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<td><strong>Introduction to Oil and Gas Production Facilities – PF2</strong></td>
<td><strong>Process Safety Engineering – PS4</strong></td>
<td><strong>Onshore Gas Gathering Systems: Design &amp; Operation – PF45</strong></td>
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<tr>
<td><strong>Concept Selection and Specification of Production Facilities in Field Development Projects – PF3</strong></td>
<td><strong>Risk Based Process Safety Management – HS45 p.5</strong></td>
<td><strong>Separation Equipment - Selection &amp; Sizing – PF42</strong></td>
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<td><strong>Process Safety Engineering Principles – PSE Virtual/Blended Course</strong></td>
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<td><strong>Relief and Flare Systems – PF44</strong></td>
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<td><strong>Oil Production and Processing Facilities – PF4 p.4</strong></td>
<td><strong>Instrumentation and Controls Fundamentals for Facilities Engineers – ICE21 p.6</strong></td>
<td><strong>Flow Assurance for Offshore Production – FAOP p.3</strong></td>
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<td><strong>Overview of Subsea Systems – OS21 p.3</strong></td>
<td><strong>Instrumentation, Controls and Electrical Systems for Facilities Engineers – ICE21 p.6</strong></td>
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<td><strong>Gas Conditioning and Processing – G4 p.5 (Virtual/Blended option for first week is available)</strong></td>
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## Facilities Course Progression Map

### Mechanical Engineering
- Non-Rotating
- Rotating
- Reliability

- Compressor Systems - Mechanical Design and Specification – ME46
- Mechanical Specification of Pressure Vessels and Heat Exchangers – ME43
- Piping Systems - Mechanical Design and Specification – ME41
- Fundamentals of Pump and Compressor Systems – ME44 p.6

### Operations & Maintenance
- O&M Management
- Operator Training

- Process Plant Reliability and Maintenance Strategies – REL5
- Turnaround, Shutdown, and Outage Management – TSOM

### Project Mgmt.
- Advanced Project Management – FPM62
- Project Management for Engineering and Construction – FPM22
- Project Controls for Contractors and Owners – PC21
- Petroleum Project Management: Principles and Practices – PPM

### Procurement/Supply Chain Management
- Managing Brownfield Projects – FPM42
- Cost/Price Analysis and Total Cost Concepts in Supply Management – SC64
- Project Management for Engineering and Construction – FPM22
- Supplier Relationship Management – SC63
- Project Controls for Contractors and Owners – PC21
- Strategic Procurement and Supply Management in the Oil and Gas Industry – SC62
- Inside Procurement in Oil & Gas – SC61

### Additional courses available in:
- Production & Completions
- Health, Safety, Environment
- Petroleum Business
- Professional Petroleum Development
- Introductory and Multi-Discipline
Overview of Offshore Systems – OS21

BASIC 5-DAY
This five-day course will accelerate the learning and productivity of individuals with little to no experience working in the offshore oil and gas industry. The course provides an overview of field development concepts and explains how offshore structures and facilities function as integrated systems. The content includes the full range of water depths from shallow to ultra-deepwater. All major components required for offshore developments such as fixed and floating platforms, drilling and workover rigs, pipelines, risers, process and utilities and construction equipment are discussed. The importance of life-cycle considerations during development planning is emphasized. Individual and group exercises, including a case study, are used throughout the course. The course instructors are experienced offshore managers.

Designed for
Technical staff, business professionals, technicians, analysts and other non-technical staff who are involved or have limited experience, or will be involved, with offshore oil and gas facilities. The course provides a basic understanding of offshore systems in all water depths, from shallow to ultra-deepwater, including design, construction, and operations.

You will learn how to
- Identify the key steps in the development of offshore fields from discovery through decommissioning
- Understand the elements of field architecture to define a workable field development
- Recognize key stakeholder issues
- Recognize offshore production facilities and structures, fixed and floating
- Understand the impact of the ocean environment on facilities design and operations
- Identify major design, construction, and operational issues and interfaces of offshore systems
- Recognize important forces on offshore structures and their influence on design and cost
- Understand strategic options for well drilling (construction) and servicing
- Appreciate the basic processes and equipment involved in the topsides design and operation
- Understand fluid transportation options and equipment
- Recognize the marine equipment used in the construction of offshore facilities
- Understand basic issues in life-cycle and decommissioning decisions
- Appreciate advances in offshore technology

Course content
Field development concepts, fixed and floating
Subsea systems
Wells, construction and servicing
Topsides facilities; processing; utilities
Oil and gas transportation systems; design and installation
Production operations
Offshore construction; equipment
Fabrication; transportation; integration; installation project management
Life-cycle considerations, including decommissioning

Overview of Subsea Systems – SS2

BASIC 5-DAY
An overview of subsea components and how they are integrated into field architecture is provided during this five-day course. Individuals will develop a basic understanding of the various subsea components used in all water depths, from relatively shallow to ultra-deepwater. The participants will all learn how the components are integrated into subsea field developments, which will accelerate learning and productivity. Installation and flow assurance are emphasized as key drivers in subsea design. The course emphasizes a systems approach to design. Individual and group exercises are used throughout the course, including a case study to develop field architecture recommendations. Course instructors are experienced offshore managers.

Designed for
Technical staff who are beginning or transitioning into the design, construction, and operation of subsea systems. Non-technical staff working with a subsea development team will benefit by developing an awareness of subsea systems.

You will learn how to
- Recognize the integrated nature of field architecture, system design, and component selection
- Identify appropriate applications for subsea systems
- Identify the main subsea components, their functions, strengths, weaknesses, and interfaces from the well to the production facility
- Understand key design, construction, and operational issues
- Describe basic operating and maintenance considerations
- Understand the key steps, from drilling through startup, for the design, fabrication, testing, installation, and operation
- Understand the importance of an integrated approach to design, flow assurance, installation, and life-cycle considerations

Course content
Applications for subsea systems • Flow assurance considerations in system design and configuration • Field architecture considerations • Subsea component descriptions and functions • Fabrication, testing, installation, commissioning, and operational issues • Production, maintenance, and repair considerations

Fundamentals of Offshore Systems Design and Construction – OS4

Foundation 10-DAY
This 10-day course provides a fundamental understanding of the technology and work processes used for the design and construction of all types of offshore systems, including considerations of offshore development, surveillance, and management. The content includes the full range of water depths from shallow water to ultra-deepwater and also addresses life-cycle considerations in all phases of offshore field development and operation. All major components required for offshore developments, such as fixed and floating platforms, drilling rigs, workover equipment, pipelines, risers, process, and utilities and construction equipment are discussed. The course design team approach needed to manage the myriad interfaces of offshore facility design, construction, and operations. Individual and group exercises are used throughout the course. A case study for an offshore project development is included.

Designed for
Individuals with a basic awareness of or experience in offshore engineering and operations. Technical staff, project engineers, engineering discipline leads, engineering specialists, and operating staff find this course accelerates their capability to contribute on offshore field development planning, design, and construction projects and field operations.

You will learn how to
- Identify the key facilities parameters that must be evaluated for field development
- Recognize the best applications and characteristics of each type of offshore fixed and floating structure
- Account for the effects of the ocean environment on facilities design, construction, and operations
- Identify the impact space, loads and forces have on the structural design and global performance of offshore structures and how they influence their cost
- Describe the impact topsides facilities (drilling, well servicing, processing, and utilities) affect the structural design and how the topside design process is driven
- Recognize and manage key design and operational interfaces between the major components of offshore facilities systems
- Understand and apply the key design, construction, and installation issues associated with fixed and floating platforms to your work

Course content
Offshore systems overview and field architecture selection • Well construction and servicing equipment and operation • Flow assurance • Topsides facilities • Oil and gas transportation facilities • Risers systems • Subsea systems • Production operations • Infrastructure impact on design and operations • Effects of the ocean environment • Introduction to naval architecture • Structural design processes and tools • Construction plans and execution • Project management lessons learned • Life-cycle and decommissioning considerations

Flow Assurance for Offshore Production – FAOP

Intermediate 5-DAY
Flow assurance is a critical component in the design and operation of offshore production facilities. This is particularly true as the industry goes to deeper water, longer tiebacks, deeper wells, and higher temperature and pressure reservoirs. Although gas hydrate issues dominate the thermohydraulic design, waxes, asphaltenes, emulsions, scale, corrosion, erosion, solids transport, slugging, and operability of all important issues which require considerable effort. The participant will be presented with sufficient theory/correlation information to be able to understand the basis for the applications. This intensive five-day course has considerable time devoted to application and design exercises to ensure the practical applications are learned.

Designed for
Engineers, operators, and technical managers who are responsible for offshore completions, production, and development; technical staff needing a foundation in principals, challenges, and solutions for offshore flow assurance. The course also is appropriate for persons involved in produced fluids flow in onshore production operations.

You will learn how to
- Identify the components of a complete flow assurance study and understand how they relate to the production system design and operation
- Interpret and use sampling and laboratory testing results of reservoir fluids relative to flow assurance
- Understand the basic properties of reservoir fluids and how they are modeled for the production flowline system
- Understand the thermodynamic modeling of steady state and transient multiphase flow in offshore production systems
- Evaluate and compare mitigation and remediation techniques for gas hydrates, paraffin (waxes), asphaltene, emulsions, scale, corrosion, erosion and solids transport, and slugging
- Understand the elements of an operability report for subsea production facilities, flowlines, and export flowlines

Course content
Overview of flow assurance • PVT analysis and fluid properties • Steady state and transient multiphase flow modeling • Hydrate, paraffin, and asphaltene control • Basics of scale, corrosion, erosion, and sand control • Fluid properly and phase behavior modeling • Equations of state • Fugacity and equilibrium • Viscosities of oils • Thermal modeling • Multiphase pressure boosting • Slugging: hydrodynamic, terrain induced, and ramp up • Commissioning, start-up, and shutdown operations

2018 Schedule and Tuition (USD)

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*plus computer charge

2018 Schedule and Tuition (USD)

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<td>16-20 Nov</td>
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*plus computer charge

Any course is available inhouse at your location. Contact us today.
Oil Production and Processing Facilities – PF4

10-DAY

The emphasis of this course is on oil production facilities - from the wellhead, to the delivery of a specification crude oil product, to the refinery. Both onshore and offshore facilities are discussed. Produced water treating and water injection systems are also covered. Solution gas handling processes and equipment will be discussed at a relatively high level. In addition to the engineering aspects of oil production facilities, practical operating problems will also be covered, including emulsion treatment, sand handling, dealing with wax and asphaltenes, etc. Exercises requiring calculations are utilized throughout the course. The course intended to complement the G-4 Gas Conditioning and Processing course, focused on the gas handling side of the upstream oil and gas facilities area.

DESIGNED FOR
Process/facilities engineers and senior operating personnel involved with the design and operation of oil and produced water processing facilities.

YOU WILL LEARN
• Well inflow performance and its impact on production/processing facilities
• About oil, gas, and water compositions and properties needed for equipment selection and sizing
• How to select and evaluate processes and equipment used to meet sales or disposal specifications
• To apply physical and thermodynamic property correlations and principles to the design and evaluation of oil production and processing facilities
• How to perform equipment sizing calculations for major production facility separation equipment
• To evaluate processing configurations for different applications
• How to recognize and develop solutions to operating problems in oil/water processing facilities

COURSE CONTENT
• Reservoir traps, rocks, and drive mechanisms
• Phase envelopes and reservoir fluid classification
• Well inflow performance
• Artificial lift
• Gas, oil, and water - composition and properties
• Oil gathering systems
• Gas-liquid separation
• Emulsions
• Oil-water separation
• Oil treating
• Desalting
• Oil stabilization and sweetening
• Oil storage and vapor recovery
• Sand, wax, asphaltenes, and scale
• Transportation of crude oil
• Produced water treatment
• Water injection systems
• Solution gas handling

2018 Schedule and Tuition (USD)

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CROSS-TRAINING

**Gas Conditioning and Processing – G4**
**The Campbell Gas Course®**

**FOUNDATION** 10-Day

The Campbell Gas Course® has been the standard of the industry for more than 47 years. Over 36,600 engineers have attended our G4 program, considered by many to be the most practical and comprehensive course in the oil and gas industry.

The Campbell Gas Course® textbooks, Volumes 1 and 2, are routinely updated to reflect evolving technologies in this broad industry. Both hand-methods and computer-aided analysis are used to examine sensitivities of technical decisions. To enhance the learning process, about 30 problems will be assigned, reviewed, and discussed throughout the course. Problems will be solved individually and in teams.

**DESIGNED FOR**
Production and processing personnel involved with natural gas and associated liquids, to acquire or realign themselves with gas conditioning and processing unit operations. This course is for facilities engineers, process engineers, senior operations personnel, field supervisors, and engineers who select, design, install, evaluate, or operate gas processing plants and related facilities. A broad approach is taken with the topics.

**YOU WILL LEARN HOW TO**
- Application of gas engineering and technology in facilities and gas plants
- Important specifications for gas, NGL, and condensate
- About the selection and evaluation of processes used to dehydrate natural gas, meet hydrocarbon dewpoint specifications, and extract NGLs
- How to apply physical/thermodynamic property correlations and principles to the operation, design, and evaluation of gas processing facilities
- Practical equipment sizing methods for major process equipment
- To evaluate technical validity of discussions related to gas processing
- To recognize and develop solutions for operating problem examples and control issues in gas processing facilities

**COURSE CONTENT**
- Gas processing systems
- Physical properties of hydrocarbons
- Terminology and nomenclature
- Qualitative phase behavior
- Vapor-liquid equilibrium
- Water-hydrocarbon phase behavior, hydrates, etc.
- Basic thermodynamics and application of energy balances
- Process control and instrumentation
- Relief and flare systems
- Fluid hydraulics; two-phase flow
- Separation equipment
- Heat transfer equipment
- Pumps
- Compressors and drivers
- Refrigeration in gas conditioning and NGL extraction facilities
- Fractionation
- Glycol dehydrogenation; TEG
- Adsorption dehydration and hydrocarbon removal
- Gas treating and sulfur recovery

**2018 Schedule and Tuition (USD)**

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The Campbell Gas Course® is now available as a blended program. The first half of the material will be delivered virtually through PetroAcademy self-paced e-Learning. The second half will be delivered in the classroom during the five day face-to-face portion of the course. Participants must complete the e-Learning portion of the course before the classroom session begins.

The G4 blended course provides both core and foundational competencies in the areas of gas conditioning and processing. It provides a review of both onshore and offshore operations, and takes a systems approach to walk through engineering fundamentals and gas processing unit and equipment operations. Both hands-on methods and computer-aided analysis are applied to examine sensitivities of technical decisions. The approaches used are applicable to both new designs, and to troubleshooting current facilities operations.

**How does the course schedule work?**
13 Online Skill Modules + 1 Week Instructor-Led Classroom Training = Complete G4 course

After registration, participants will be given access to the e-Learning course content, approximately 52 total hours of self-paced activity organized in 13 modules:
- Hydrocarbon Components and Physical Properties
- Introduction to Production and Gas Processing Facilities
- Qualitative Phase Behavior and Vapor Liquid Equilibrium
- Water/Hydrocarbon Phase Behavior
- Thermodynamics and Application of Energy Balances
- Fluid Flow
- Heat Transfer Equipment
- Separation
- Heat Transfer Equipment Overview
- Pumps and Compressors Overview
- Refrigeration, NGL Extraction and Fractionation
- Contaminant Removal - Gas Dehydration
- Contaminant Removal - Acid Gas and Mercury Removal

In the classroom, participants will cover:
- Vapor Liquid Equilibrium
- Hydrate Inhibition
- Multiphase Flow
- Hydrate Inhibitor
- Separation
- Heat Transfer
- Fluid Flow
- Refrigeration
- Fractionation
- Pumps and Compression
- Adiabatic Dehydration
- NGL Extraction
- Contaminant Removal and Protection

**2018 Schedule and Tuition (USD)**

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**Risk Based Process Safety Management – HS45**

**FOUNDATION** 5-DAY

This course introduces process safety management in the oil and gas industry, the elements and benefits of process safety management systems, and tools for implementing and managing a system. In this course the participant will learn to use tools and techniques for managing process safety. The Center for Chemical Process Safety’s (CCPS) book titled “Guidelines for Risk Based Process Safety” or “RIPS Guidelines” will be the text for this course. Participant centered exercises and selected case studies will be used to build on the concepts that CCPS advocates for risk based process safety.

Throughout the course, participants will be challenged to think how their process safety management system can be enhanced and modified to meet the concepts of risk-based decision making. An individual action plan will be developed to apply the information from the course to the workplace.

**DESIGNED FOR**
HSE professionals, operations and maintenance technicians, engineers, supervisors and project managers requiring a basic foundation in developing and managing process safety. The more technical aspects of process safety engineering are covered in PS4, Process Safety Engineering.

**YOU WILL LEARN HOW TO**
- Unit processes applicable to Process Safety Management (PSM) and describe relevant terms used
- Identify which standards are to be applied for managing process hazards
- Apply programs and tools for managing a PSM system
- Choose appropriate decision making methods and tools to identify process hazards
- Describe and use techniques available for control of hazards associated with process designs
- Describe the criteria and methods of selecting equipment and safe guarding controls
- Research and apply the performance parameters for the safety systems in operations
- Explain the role of all disciplines and their contribution to the management of potential HSE hazards

**COURSE CONTENT**
Process safety culture and competency • Compliance with standards • Understand hazards and risk • Operating procedures and safe work practices • Asset integrity and reliability • Management of change • Conduct of operations • Incident investigation (associated with plant failures) • Measurement and metrics • Management review and continuous improvement

**2018 Schedule and Tuition (USD)**

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FOR MORE INFORMATION, VISIT PETROSILLS.COM/G4BLENDED
Onshore Pipeline Facilities - Design, Construction and Operations – PL42

FOUNDATION 5-DAY

This intensive 5-day foundation level course explores best practices for developing and maintaining pipeline systems that maximize life cycle reliability: employee, public, and environmental safety; and cost effectiveness. Design and team exercises are an integral part of this course.

DESIGNED FOR
Pipeline project managers and engineers, operations and maintenance supervisors, regulatory compliance personnel, and other technical professionals with 1-3 years of experience in natural gas, crude oil, refined petroleum products, LPGs, NGL, chemical, carbon dioxide pipeline engineering, construction, operations, or maintenance. This course is intended for participants needing a broad understanding of the planning, development, construction, start-up, and operating and asset integrity management of onshore pipelines.

YOU WILL LEARN HOW TO
• Apply regulatory codes, standards, and industry guidelines (API and others) that control and guide the permitting, design, construction, operation, and maintenance of pipeline facilities
• Apply mechanical and physical principles to pipeline design, hydraulics, and material selection
• Apply mechanical and physical principles to pump and compressor selection
• Describe the important factors in station design
• Describe the importance of route selection and hydraulics for long term profitability, reliability, and safety
• Identify special design and construction challenges of onshore pipeline systems
• Describe methods of river and road crossings, HDD crossings, bores
• Identify the principle interfaces and potential interrelationships of pipeline facilities, such as pump stations and terminals, on design and operations
• Apply operational and maintenance tools and procedures, including system monitoring and control, leak detection, corrosion control, custody measurement and quality control, asset integrity management, and emergency response planning

COURSE CONTENT
• Fundamentals of electricity, such as: voltage, current, resistance, and power factor
• Electrical specifications, such as: voltage selection, load lists, and power
• One-line diagrams and components of power distribution, including transformers, switchgear, MCCs, VFDs, and power distribution
• Infrastructure components, such as: cable, conduit, cable tray, and duct banks
• Classification of hazardous locations and equipment specifications
• Safety risks and mitigation strategies for power systems, including: short circuit and overcurrent protection, ground faults, shock hazards, and arc flash
• Fundamentals of control systems, sensors, controllers, and final elements
• Typical control strategies and configurations for common oil and gas process equipment, such as: separators, pumps, distillation towers, filters, contactors, compressors, heat exchangers, and fired heaters
• Key requirements for instrument specifications: accuracy, signal selection, pressure/temperature limits, material compatibility, installation considerations, capabilities and limits, and relative cost
• Basics of sizing criteria of shutdown and control valves
• Control system functions, limitations, and architectures, including: PLC, DCS, SIS, RTU, and SCADA; common networking systems, including: Ethernet, Modbus and Fieldbus

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