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<th>Facilities Course Progression Map</th>
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<td>Mechanical Specification of Pressure Vessels and Heat Exchangers – ME43</td>
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<td>Fundamentals of Pump and Compressor Systems – ME44 p.6</td>
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<td>Piping Systems - Mechanical Design and Specification – ME41</td>
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<td><strong>Project Mgmt.</strong></td>
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**Basics of Rotating and Static Mechanical Equipment – RSM**

**Applied Maintenance Management – OM21**

**Oil & Gas Processing Facilities for Operations & Maintenance – OT1**

**Amine Sweetening and Gas Dehydration for Operations & Maintenance – OT41**

**NGL Extraction, Stabilization and Fractionation for Operations & Maintenance – OT42**

**Crude Oil Pipeline Operations – OT50**

**LNG Facilities for Operations & Maintenance – OT43**

**Maintenance Planning and Work Control – OM41**

**Cost/Price Analysis and Total Cost Concepts in Supply Management – SC64**

**Effective Materials Management – SC42**

**Contracts and Tenders Fundamentals – SC41**

**Managing Brownfield Projects – FPM42**

**Project Management for Engineering and Construction – FPM22**

**Project Controls for Contractors and Owners - PC21**

**Inside Procurement in Oil & Gas – SC61**

**Petroleum Project Management: Principles and Practices – PPM**

**Managing Brownfield Projects – FPM42**

**Project Management for Engineering and Construction – FPM22**

**Project Controls for Contractors and Owners - PC21**

**Inside Procurement in Oil & Gas – SC61**
**Midstream Operations and Pipeline e-Learning Library**

This library extends technical skill fundamentals into midstream specific concepts.

**Topics Include:**
- Storage Tanks
- Pipeline Fundamentals
- Condensate Stabilization System
- Dewpoint Testing
- Fractionation Distillation Process Fundamentals
- Hydrocarbons
- Pigging Operations
- Purging with Nitrogen
- Salt Caverns and Underground Storage
- Solid Desiccants
- Tower Fouling and Corrosion Cleaning
- and more...

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**Onshore Pipeline Facilities - Design, Construction and Operations – PL42**

**FOUNDATION 5-DAY**

Successful onshore pipeline businesses require personnel competent in fully integrated approaches to evaluation, planning, design, construction, operation, and asset integrity management. 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 learn exercises are an integral part of this course.

**DESIGNED FOR**

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, LNG, 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
- Identify special design and construction challenges of offshore pipeline systems
- Identify offshore safety and environmental practices and their effect on design, construction, and operation

**COURSE CONTENT**

Overview of oil and gas transportation systems • Review pipeline hydraulics, focusing on those aspects that affect design, construction, and operations • Pipeline systems definition, survey, and route selection • Safety, environmental, and regulatory considerations, focusing on Codes and Standards related to pipelines • Pipeline conceptual and mechanical design for strength, stability, and constructability • Pipeline materials and components selection including line pipe, corrosion and cathodic protection, and coatings • Specialized equipment and materials for integrating with subsea wellhead/manifold systems, side taps, insulation, and pipe-in-pipe will be reviewed • Special design and construction considerations for risers and umbilicals, foreign pipeline crossings, single point moorings, and shore approaches • Introduction to flow assurance considerations and pipeline integrity aspects including in-line inspection, leak detection and emergency planning considerations • Pipeline operations, maintenance and repair considerations and their impact on design and material selection

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**Offshore Pipeline Design and Construction – PL43**

**FOUNDATION 5-DAY**

This intensive five-day foundation level course covers the principal aspects of design, construction, and operations of offshore pipeline systems. The course focuses on pipeline mechanical, strength, and stability design, and construction. Special challenges, such as shoreline crossings, foreign pipeline crossings, repair methods, flow assurance, corrosion control and cathodic protection are an integral part of this course. Participants will acquire the essential knowledge and skills to design, construct, and operate pipelines. Design problems and team projects are part of this course.

**DESIGNED FOR**

Engineers, designers and operators who are actively involved in the design, specification, construction, and operation of offshore pipeline systems.

**YOU WILL LEARN HOW TO**

- Apply mechanical, strength, and physical principles to pipeline design, material selection, construction, and operation
- Describe the key construction methods
- Define the importance of environmental conditions, construction methods, and pipeline system hydraulics in design, installation, and operations of offshore pipeline systems
- Identify special design and construction challenges of offshore pipeline systems
- Incorporate construction methods into the design of a pipeline system
- Identify the principal interfaces of pipeline facilities, such as platforms, floating production systems, sub-sea wellheads, and SPMs on design, construction, and operations of offshore pipeline systems
- Identify offshore safety and environmental practices and their effect on design, construction, and operations

**COURSE CONTENT**

Overview of oil and gas transportation systems • Review pipeline hydraulics, focusing on those aspects that affect design, construction, and operations • Pipeline systems definition, survey, and route selection • Safety, environmental, and regulatory considerations, focusing on Codes and Standards related to pipelines • Pipeline conceptual and mechanical design for strength, stability, and constructability • Pipeline materials and components selection including line pipe, corrosion and cathodic protection, and coatings • Specialized equipment and materials for integrating with subsea wellhead/manifold systems, side taps, insulation, and pipe-in-pipe will be reviewed • Special design and construction considerations for risers and umbilicals, foreign pipeline crossings, single point moorings, and shore approaches • Introduction to flow assurance considerations and pipeline integrity aspects including in-line inspection, leak detection and emergency planning considerations • Pipeline operations, maintenance and repair considerations and their impact on design and material selection

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**Terminals and Storage Facilities – PL44**

**FOUNDATION 5-DAY**

This 5-day, foundation level course reviews key issues associated with development, design, construction, and operation of terminals and storage facilities for liquid hydrocarbons and NGLs. The course topics cover six areas: 1) terminal codes and siting constraints, 2) terminal design and equipment layout, 3) types of storage and selection criteria, 4) design considerations for loading racks, fire protection, vapor recovery, blending equipment, and water treatment, 5) detailed design of storage tanks, vessels, and caverns, and 6) operations and maintenance. Safety, quality control, system reliability, availability, and regulatory compliance are integrated throughout the course. Case studies and team exercises are used to reinforce key points.

**DESIGNED FOR**

Project managers, engineers, operations and maintenance supervisors, and regulatory compliance personnel with 1-3 years of experience in planning, engineering, constructing and/or operating terminals and storage facilities for hydrocarbon liquids, NGLs, and petrochemical feedstocks. This course is for participants needing a foundation level understanding of the planning, engineering, construction, operation, and maintenance of storage and terminals connected to pipelines, rail, barges/tankers and/or truck loading facilities.

**YOU WILL LEARN**

- Storage and terminals basics for hydrocarbon liquids, NGLs, and petrochemical feedstocks
- Design and operation of atmospheric storage tanks and pressurized bullets and spheres
- Fundamentals of underground storage (salt and rock caverns)
- Safety, product quality, and reliability/availability concerns

**COURSE CONTENT**

Sizing criteria and economics for storage and terminal facilities • Various storage types (atmospheric storage tanks, pressure vessels, salt or rock caverns) and appropriate applications • Terminal and tank farm layout constraints • Details of industry codes and standards, plus regulatory and environmental compliance • Selection of equipment for delivery and receipt from from pipelines, barges and ships, trucks, and rail, including metering options, loading arms, pumps, and control systems • Blending options and equipment, VRU/VCU, water treating, and fire protection • Key factors affecting safety, product quality, system reliability, and profitability in design, construction, and operation • Atmospheric storage tank design, layout, construction, corrosion prevention, and operations covering API 650 and API 603 • Overview of pressure vessel and sphere design and construction • Design, development, and operation of underground cavern storage facilities

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For more information, please visit www.petroskills.com/elearning or email solutions@petroskills.com

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Oil Production and Processing Facilities – PF4

FOUNDATION 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 is 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

2019 Schedule and Tuition (USD)

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**Gas Conditioning and Processing Principles – G3**

**FOUNDATION 10-DAY**

The Campbell Gas Course® has been the standard of the industry for more than 52 years. Tens of thousands of 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 acquaint or reacquaint 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, LNG, 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 dehydration; TEG
- Adsorption dehydration and hydrocarbon removal
- Gas treating and sulfur recovery
- Overview and summary

**2019 Schedule and Tuition (USD)**

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Self-paced, virtual course - start anytime.

**FOR MORE INFORMATION, VISIT PETROSKILLS.COM/G3ONLINE**

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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 “RBPS 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**

- Identify 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

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**CROSS-TRAINING**

This course will be delivered virtually through PetroSkills providing participants with the knowledge they need at their convenience.

The Campbell Gas Course® has been the industry standard for more than 50 years and the core competencies of the Campbell Gas Course are now available in self-paced online Skill Modules™. These competencies set the base knowledge that is required for a successful career as an entry-level facility engineer, seasoned operator, and/or field supervisor. These modules provide an understanding of common terminology, hydrocarbons and their physical properties, qualitative and quantitative phase behavior, hydrates, and fluid flow. In addition, they provide a systematic approach to understanding the common types of equipment, and the primary unit operations in both offshore and onshore gas conditioning and processing facilities. Each module ranges from 3 – 5 hours of self-paced activities, with pre and post assessments. In addition, the modules have interactive exercises and problems to solve on the various topics.

**DESIGNED 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.

**SKILL 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
- Relief and Flare Systems
- 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

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5-DAY

This foundation-level course provides an introduction and overview of electrical systems, instrumentation, process control, and control/safety systems typically encountered in oil and gas facilities. The focus is on understanding terminology, concepts, typical equipment configurations, and common pitfalls in order to improve communication with electrical and I&C professionals. This course covers similar content to our E3 and IC3 courses, but at a more conceptual level. This course is not a prerequisite for taking E3 or IC3, but rather a replacement for those that are not able to take both E3 and IC3.

DESIGNED FOR
Process, chemical, and mechanical engineers, (i.e. non-instrumentation and non-electrical disciplines), as well as other technical and non-technical professionals with little or no background in I&C systems. Electrical and Instrumentation Engineers should consider E3 and IC3 for more in-depth coverage.

YOU WILL LEARN
• Fundamentals of electricity, such as voltage, current, resistance, power factor, and single/three-phase power systems
• Electrical specifications, such as voltage selection, load lists, and power
• How to read one-line diagrams and understand the function of the components of power distribution, including transformers, switchgear, MCCs, VFDs, and power distribution
• The function and considerations of infrastructure components, such as cable, conduit, cable tray, and duct banks
• Awareness of the concepts behind 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
• Key requirements for instrument specifications such as accuracy, signal selection, process conditions, material compatibility, installation considerations, capabilities and limits, and relative cost
• Basics of specification 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
• Exposure to the typical documentation and drawings necessary for the design, specification, installation, operation and maintenance of electrical, instrumentation and control systems

COURSE CONTENT
Fundamentals of electricity • Control system fundamentals • Field measurement and control devices • Hazardous area classification for oil and gas applications • Programmable electronic systems (PLC, DCS, SIS, SCADA) • and more...
TO VIEW OUR COURSES
IN OTHER DISCIPLINES, VISIT:

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

**Facilities**
- Gas Processing
- Process Facilities
- Offshore & Subsea
- Instrumentation, Controls & Electrical
- Mechanical Engineering
- Reliability Engineering
- Procurement/Supply Chain Management
- Refining

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**Health, Safety, Environment**

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

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- Learning applied at point of need

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

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