PetroSkills®
PetroAcademy™

2022

PetroAcademy Skill Module Catalog

Online Training

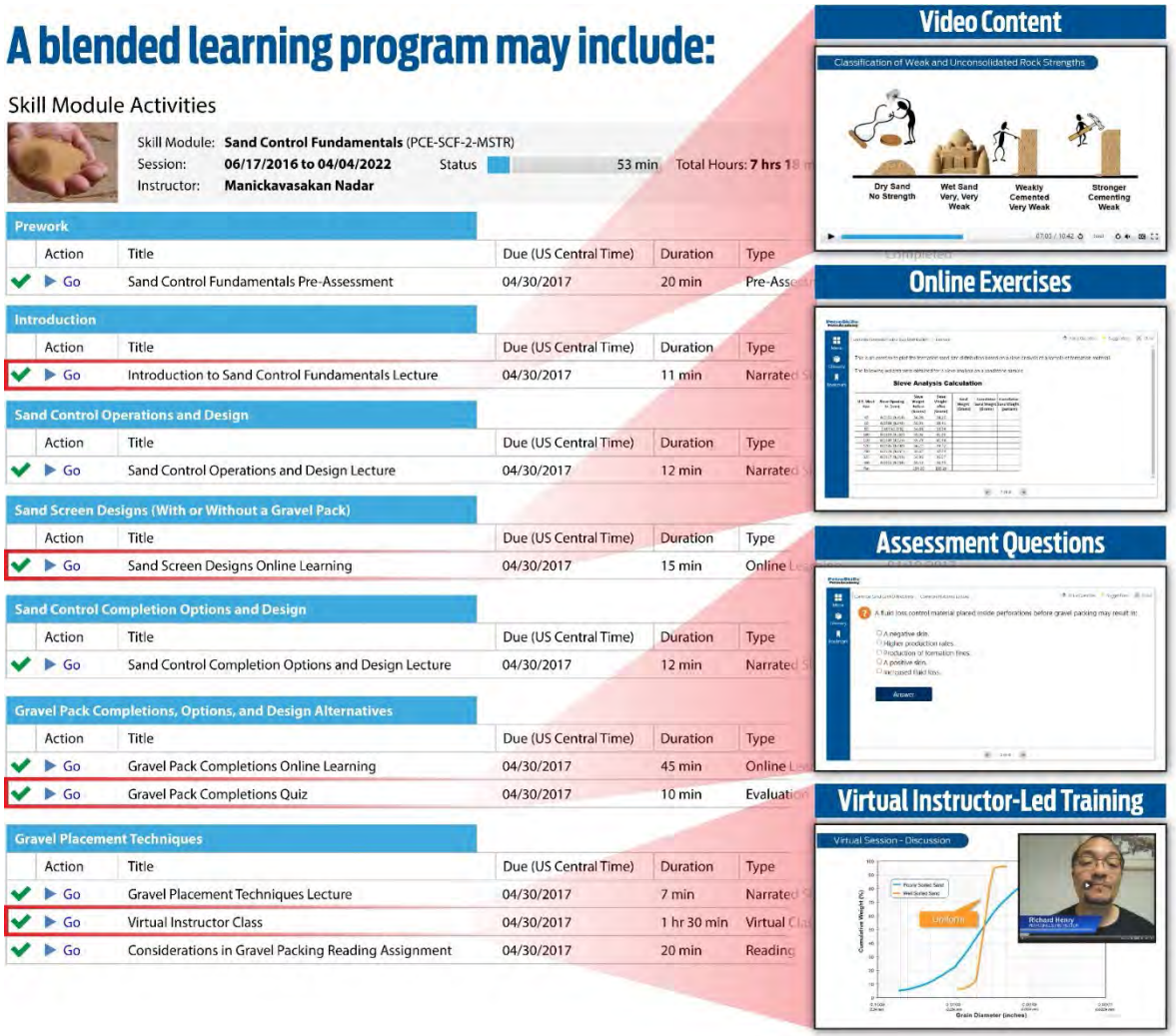
www.petroskills.com/blended

ABOUT PETROACADEMY®

PetroAcademy combines PetroSkills industry knowledge, expertise, content, and technology to develop workforce competency. Each PetroAcademy offering integrates multiple learning activities, such as reading assignments, self-paced e-Learning, virtual instructor-led sessions, discussion forums, group exercises, case studies, quizzes, field trips, and experiential activities. This combination of activities serves to increase knowledge retention. PetroAcademy further optimizes time away from work while incurring no travel expense.

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

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



For additional information, please refer to contact petroacademy.com/blended

PetroAcademy Skill Module™ Catalog

Definitions of Skill Module Levels

Core = Awareness Competency Level, completely self-paced online activities, no instructor-led component.

Fundamental = Fundamental Competency Level, mixture of both self-paced online activities and instructor-led virtual sessions.

v.22.14 Dec-09-2022

Skill Modules by Discipline

Subsurface

Introductory and Multi-Discipline			
IAM-EIA-1	E&P Industry and Asset Life Cycle Core	Core	Released
IAM-PGC-1	Petroleum Geology Core	Core	Released
IAM-HRC-1	Hydrocarbon Reservoirs Core	Core	Released
IAM-RFP-1	Rock and Fluid Properties Core	Core	Released
IAM-SSE-1	Surface/Subsurface Exploration Core	Core	Released
IAM-DOW-1	Drilling Operations and Well Completions Core	Core	Released
IAM-POC-1	Production Operations Core	Core	Released
IAM-DWO-1	Defining Well Objectives Core	Core	Released
IAM-BHC-1	Bits and Hydraulics Core	Core	Released
IAM-DSB-1	Drill String and BHA Core	Core	Released
IAM-DFS-1	Drilling Fluids and Solids Control Core	Core	Released
IAM-DDC-1	Directional Drilling and Trajectory Design Core	Core	Released
Geology			
IAM-RFP-1	Rock and Fluid Properties Core	Core	Released
IAM-EIA-1	E&P Industry and Asset Life Cycle Core	Core	Released
IAM-PGC-1	Petroleum Geology Core	Core	Released
IAM-HRC-1	Hydrocarbon Reservoirs Core	Core	Released
IAM-DOW-1	Drilling Operations and Well Completions Core	Core	Released
IAM-SSE-1	Surface/Subsurface Exploration Core	Core	Released
GEO-GOC-1	Basic Petroleum Geology – Introduction Core	Core	Released
GEO-FGC-1	Basic Petroleum Geology – Foundation Geological Concepts Core	Core	Released
GEO-SGD-1	Basic Petroleum Geology – Sedimentary Geology – Depositional Controls for Carbonate Reservoir Rocks Core	Core	Released
GEO-SGC-1	Basic Petroleum Geology – Sedimentary Geology – Depositional Controls for Clastic Reservoir Rocks Core	Core	Released
GEO-RFS-1	Basic Petroleum Geology – Petroleum System – Overview and Source Core	Core	Released
GEO-RSC-1	Basic Petroleum Geology – Petroleum System – Reservoir and Seal Core	Core	Released
GEO-TTC-1	Basic Petroleum Geology – Petroleum System – Trap and Timing Core	Core	Released
GEO-EXC-1	Basic Petroleum Geology – Petroleum System – Examples Core	Core	Released
GEO-PCE-1	Basic Petroleum Geology – Phases of Conventional Exploration and Development Core	Core	Released
GEO-GTT-1	Basic Petroleum Geology – Tools and Techniques Core	Core	Released
GEO-UPR-1	Basic Petroleum Geology – Unconventional Petroleum Resources Core	Core	Released
GEO-ISE-1	Interpreting Siliciclastic Environment of Deposition (EOD) for Deltaic Systems Core	Core	Released
GEO-IGE-1	Introduction to Geosteering Core	Core	Released
GEO-IGC-1	Introduction to Gridding for Computer-based Subsurface Mapping Core	Core	Released

Geophysics			
IAM-SSE1	Surface/Subsurface Exploration Core	Core	Released
GEP-SIG-1	Seismic Image and Geological Association with Seismic Reflections Core	Core	Released
GEP-WSV-1	Wavelet and Seismic Velocities Core	Core	Released
GEP-SAP-1	Seismic Acquisition, Processing and Migration Core	Core	Released
GEP-SMC-1	Seismic Mapping Core	Core	Released
GEP-DHI-1	Direct Hydrocarbon Indicators and Amplitude versus Offset Core	Core	Released
GEP-SIA-1	Seismic Inversion and Attributes Core	Core	Released
GEP-SUR-1	Seismic for Unconventional Reservoirs Core	Core	Released
Petrophysics			
PPH-IOP-1	Introduction and Overview of Petrophysics Core	Core	Released
PPH-MLC-1	Mud Logging, Coring and Cased Hole Logging Operations Core	Core	Released
PPH-PLC-1	Porosity Logging Core	Core	Released
PPH-GRS-1	Gamma Ray and SP Logging Core	Core	Released
PPH-FTC-1	Formation Testing Core	Core	Released
PPH-CAC-1	Core Analysis Core Knowledge	Core	Released
PPH-RLT-1	Resistivity Logging Tools and Interpretation Core	Core	Released
PPH-PEC-1	Petrophysical Evaluation Core	Core	Released
PPH-SPT-1	Special Petrophysical Tools: NMR and Image Logs Core	Core	Released
PPH-IPG-1	Introduction to Petroleum Geomechanics and its Application Core	Core	Released
PPH-FRM-1	Rock Mechanics Core	Core	Released
PPH-PPM-1	Pore Pressure Measurement and Prediction Core	Core	Released
PPH-CIC-1	Characterization of In-situ Stresses Core	Core	Released
PPH-RMS-1	Rock Mechanics for Shale Plays Core	Core	Released
PPH-LMB-1	Laboratory Measurements of Basic Rock Mechanical Properties Core	Core	Released
PPH-LFM-1	Laboratory and Field Measurement of Special Rock Mechanical Properties Core	Core	Released
PPH-IUR-1	Introduction to the Petrophysical Interpretation of Unconventional Reservoirs Core	Core	Coming soon
PPH-OPI-1	Overview of Petrophysical Interpretation Core	Core	Coming soon
DSA-IDW-1	Introduction to Data-driven Workflows Core	Core	Coming soon
DSA-SUL-1	Supervised Machine Learning Core	Core	Coming soon
DSA-ULC-1	Unsupervised Machine Learning and Clustering Core	Core	Coming soon
Reservoir Engineering			
RES-RRP-1	Reservoir Rock Properties Core	Core	Released
RES-RRP-2	Reservoir Rock Properties Fundamentals	Fundamental	Released
RES-RFC-1	Reservoir Fluid Core	Core	Released
RES-RFF-2	Reservoir Fluid Fundamentals	Fundamental	Released
RES-RFP-1	Reservoir Flow Properties Core	Core	Released

Reservoir Engineering *(Continued)*			
RES-RFP-2	Reservoir Flow Properties Fundamentals	Fundamental	Released
RES-RMB-1	Reservoir Material Balance Core	Core	Released
RES-RMB-2	Reservoir Material Balance Fundamentals	Fundamental	Released
RES-RSA-1	Decline Curve Analysis and Empirical Approaches Core	Core	Released
RES-RSA-2	Decline Curve Analysis and Empirical Approaches Fundamentals	Fundamental	Released
RES-RRC-1	Reserves and Resources Core	Core	Released
RES-PTA-1	Pressure Transient Analysis Core	Core	Released
RES-RTA-1	Rate Transient Analysis Core	Core	Released
RES-RFD-1	Reservoir Fluid Displacement Core	Core	Released
RES-RFD-2	Reservoir Fluid Displacement Fundamentals	Fundamental	Released
RES-EOR-1	Enhanced Oil Recovery Core	Core	Released
RES-IOR-2	Improved Oil Recovery Fundamentals	Fundamental	Released
RES-RSI-1	Reservoir Simulation Core	Core	Released
RES-RSC-1	Reservoir Surveillance Core	Core	Released
RES-RSF-2	Reservoir Surveillance Fundamentals	Fundamental	Released
RES-RMC-1	Reservoir Management Core	Core	Released
RES-RMF-2	Reservoir Management Fundamentals	Fundamental	Released
RES-IUR-1	Introduction to Unconventional Reservoirs Core	Core	Released
RES-URP-1	Unconventional Reservoir Properties Core	Core	Released
RES-URP-2	Unconventional Reservoir Properties Fundamentals	Fundamental	Released
RES-URA-1	Unconventional Reservoir Analysis Core	Core	Released
RES-URA-2	Unconventional Reservoir Analysis Fundamentals	Fundamental	Released
RES-WOV-1	Waterflood Overview Core	Core	Released
RES-WRP-2	Waterflood Reservoir Property Effects Fundamentals	Fundamental	Released
RES-WRH-2	Waterflood Reservoir Heterogeneity Effects Fundamentals	Fundamental	Released
RES-WFO-1	Waterflood Forecasting Overview Core	Core	Released
RES-WAF-2	Waterflood Analytical Forecasting Fundamentals	Fundamental	Released
RES-WSC-1	Waterflood Surveillance Core	Core	Released
RES-PVI-2	Producing versus Injecting Wells Fundamentals	Fundamental	Released
RES-WWS-1	Waterflood Water Sources Core	Core	Released
RES-WRO-1	Waterflood Reservoir Optimization Core	Core	Released
RES-WPC-1	Waterflood Planning Core	Core	Released
Well Construction / Drilling			
IAM-DOW-1	Drilling Operations and Well Completions Core	Core	Released
IAM-DWO-1	Defining Well Objectives Core	Core	Released
WCD-CDE-1	Characterizing the Drilling Environment Core	Core	Released

Well Construction / Drilling (*Continued*)			
IAM-DDC-1	Directional Drilling and Trajectory Design Core	Core	Released
IAM-DFS-1	Drilling Fluids and Solids Control Core	Core	Released
WCD-OCC-1	Oilfield Casing Core	Core	Released
IAM-BHC-1	Bits and Hydraulics Core	Core	Released
IAM-DSB-1	Drill String and BHA Core	Core	Released
WCD-CRO-1	Casing Running Operations Core	Core	Released
PCE-PRC-1	Primary and Remedial Cementing Core	Core	Released
WCD-WPM-1	Well Performance Management Core	Core	Released
WCD-WCS-1	Well Construction Supply Chain Management Core	Core	Released
WCD-WSM-1	Well Site Management Part 1 – Logistics, Communication and Safety Core	Core	Released
WCD-WS2-1	Well Site Management Part 2 – Planning, Operations and Continuous Improvement Core	Core	Released
WCD-SPP-1	Stuck Pipe Prevention Core	Core	Released
Production and Completions Engineering			
PCE-PPC-1	Production Principles Core	Core	Released
PCE-WPN-2	Well Performance and Nodal Analysis Fundamentals	Fundamental	Released
PCE-OCW-1	Onshore Conventional Well Completions Core	Core	Released
PCE-OUW-1	Onshore Unconventional Well Completions Core	Core	Released
PCE-PRC-1	Primary and Remedial Cementing Core	Core	Released
PCE-PEC-1	Perforating Core	Core	Released
PCE-RPJ-1	Rod, PCP, Jet Pumps and Plunger Lift Core	Core	Released
PCE-RRP-2	Reciprocating Rod Pumps Fundamentals	Fundamental	Released
PCE-GLE-1	Gas Lift and ESP Pumps Core	Core	Released
PCE-GLF-2	Gas Lift Fundamentals	Fundamental	Released
PCE-ESP-2	Electrical Submersible Pumps Fundamentals	Fundamental	Released
PCE-FDC-1	Formation Damage and Matrix Stimulation Core	Core	Released
PCE-FDF-2	Formation Damage and Matrix Acidizing Fundamentals	Fundamental	Released
PCE-FAP-1	Flow Assurance and Production Chemistry Core	Core	Released
PCE-SCC-1	Sand Control Core	Core	Released
PCE-SCF-2	Sand Control Fundamentals	Fundamental	Released
PCE-HFC-1	Hydraulic Fracturing Core	Core	Released
PCE-PPD-1	Production Problem Diagnosis Core	Core	Released
PCE-PLC-1	Production Logging Core	Core	Released
PCE-PLF-2	Production Logging Fundamentals	Fundamental	Released
PCE-DEC-1	Design Process for Completion and Workovers Core	Core	Released
PCE-DEF-2	Completion Design Fundamentals	Fundamental	Released
PCE-WCF-2	Well Completions Fundamentals	Fundamental	Released

Production and Completions Engineering *(Continued)*			
PCE-WIC-1	Well Intervention Core	Core	Released
PCE-WOF-2	Workover Fundamentals	Fundamental	Released
PCE-TRP-1	The Role of Production Technology Core	Core	Released
PCE-PTA-1	Production Technology Applications Core	Core	Released
PCE-WDH-1	Production Logging Wellsite and Downhole Environment Core	Core	Released
PCE-TSE-1	Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals	Fundamental	Released
PCE-TPF-2	Conventional Production Logging: Two-Phase Flow Fundamentals	Fundamental	Released
PCE-PLH-2	Production Logging in High Angle/Horizontal Wells Fundamentals	Fundamental	Released
PCE-ANP-2	Advanced Nuclear Production Logging Fundamentals	Fundamental	Released
PCE-SPP-2	Special Purpose Production Logging Fundamentals	Fundamental	Released
Unconventional Resources			
RES-IUR-1	Introduction to Unconventional Reservoirs Core	Core	Released
RES-RTA-1	Rate Transient Analysis Core	Core	Released
RES-URP-1	Unconventional Reservoir Properties Core	Core	Released
RES-URP-2	Unconventional Reservoir Properties Fundamentals	Fundamental	Released
RES-URA-1	Unconventional Reservoir Analysis Core	Core	Released
RES-URA-2	Unconventional Reservoir Analysis Fundamentals	Fundamental	Released
PCE-OUW-1	Onshore Unconventional Well Completions Core	Core	Released
PCE-HFC-1	Hydraulic Fracturing Core	Core	Released
GEO-UPR-1	Basic Petroleum Geology – Unconventional Petroleum Resources Core	Core	Released
GEP-SUR-1	Seismic for Unconventional Reservoirs Core	Core	Released
PPH-IUR-1	Introduction to the Petrophysical Interpretation of Unconventional Reservoirs Core	Core	Coming soon
PPH-IPG-1	Introduction to Petroleum Geomechanics and its Application Core	Core	Released
PPH-FRM-1	Rock Mechanics Core	Core	Released
PPH-PPM-1	Pore Pressure Measurement and Prediction Core	Core	Released
PPH-LMB-1	Laboratory Measurements of Basic Rock Mechanical Properties	Core	Released
PPH-LFM-1	Laboratory and Field Measurement of Special Rock Mechanical Properties Core	Core	Released
PPH-CIC-1	Characterization of In-Situ Stresses Core	Core	Released
PPH-RMS-1	Rock Mechanics for Shale Plays Core	Core	Released
Project Management			
PRJ-OFD-1	Onshore Field Development Programs and Projects Core	Core	Released
PRJ-PGC-1	Project Governance Core	Core	Released
PRJ-PRO-1	Project Resources and Organization Core	Core	Released
PRJ-SDC-1	Scope Delivery Core	Core	Released
PRJ-DEM-1	Design Engineering Management Core	Core	Released
PRJ-AGS-1	Acquiring Goods and Services Core	Core	Released

Project Management (*Continued*)			
PRJ-CMC-1	Construction Management Core	Core	Released
PRJ-RMC-1	Project Risk Management Core	Core	Released
PRJ-CEC-1	Cost Estimating for Facility Projects Core	Core	Released
PRJ-SCC-1	Scheduling Core	Core	Released
PRJ-PMC-1	Progress Measurement Core	Core	Released
Petroleum Business			
PEB-PFC-1	Production Forecasting Core	Core	Released
PEB-OGP-1	Oil and Gas Pricing Core	Core	Released
PEB-CFC-1	Cash Flow Core	Core	Released
PEB-EDT-1	Economic Decision Tools Core	Core	Released
PEB-RUC-1	Risk and Uncertainty Core	Core	Released
PEB-FOC-1	Financing and Ownership Core	Core	Released
PEB-PIA-1	Petroleum Industry Accounting Core	Core	Released
PEB-BUC-1	Budgeting Core	Core	Released
PEB-DAP-1	Decision Analysis Process Core	Core	Released
PEB-VCC-2	Value of Control Fundamentals	Fundamental	Released
PEB-BRC-2	Value of Information and Bayes' Rule Fundamentals	Fundamental	Released
PEB-JBC-2	Judgments and Biases Fundamentals	Fundamental	Coming soon
PEB-DPV-2	Decision Policy and Value Calculations Fundamentals	Fundamental	Coming soon
PEB-DIS-2	Monte Carlo Simulation and Distribution Fundamentals	Fundamental	Coming soon
Data Science and Analytics			
DSA-IDO-1	Introduction to the Digital Oilfield Core	Core	Released
DSA-OTF-1	Operational Technology and Field Networks Core	Core	Released
DSA-DOC-1	Digital Oilfield Challenges, Barriers to Adoption, and Risks Core	Core	Released
DSA-DFD-1	Data Foundation for the Digital Oilfield Core	Core	Released
DSA-FDO-1	The Future of the Digital Oilfield Core	Core	Coming soon
DSA-IDW-1	Introduction to Data-driven Workflows Core	Core	Coming soon
DSA-SUL-1	Supervised Machine Learning Core	Core	Coming soon
DSA-ULC-1	Unsupervised Machine Learning and Clustering Core	Core	Coming soon

Facilities

Gas Processing			
GAS-HCP-1	Hydrocarbon Components and Physical Properties Core	Core	Released
GAS-IGC-1	Introduction to Production and Gas Processing Facilities Core	Core	Released
GAS-QPB-1	Qualitative Phase Behavior and Vapor-Liquid Equilibrium Core	Core	Released
GAS-WHP-1	Water / Hydrocarbon Phase Behavior Core	Core	Released
GAS-TAE-1	Thermodynamics and Application of Energy Balances Core	Core	Released
GAS-FFC-1	Fluid Flow Core	Core	Released
GAS-SEC-1	Separation Core	Core	Released
GAS-HTE-1	Heat Transfer Equipment Overview Core	Core	Released
GAS-PCC-1	Pumps and Compressors Core	Core	Released
GAS-RNG-1	Refrigeration, NGL Extraction, and Fractionation Core	Core	Released
GAS-CRD-1	Contaminant Removal – Gas Dehydration Core	Core	Released
GAS-CRA-1	Contaminant Removal – Acid Gas and Mercury Removal Core	Core	Released
Process Facilities			
PRS-PSR-1	Process Safety Risk Analysis and Inherently Safer Design Core	Core	Released
PRS-PHA-1	Process Hazards Analysis and Layers of Protection Analysis Core	Core	Released
PRS-LDH-1	Leakage and Dispersion of Hydrocarbons Core	Core	Released
PRS-CBH-1	Combustion Behavior of Hydrocarbons Core	Core	Released
PRS-SIH-1	Sources of Ignition and Hazardous Area Classification Core	Core	Released
PRS-SPS-1	Specific Plant Systems and Equipment Core	Core	Released
PRS-RFS-1	Relief and Flare Systems Core	Core	Released
PRS-HID-1	Historical Incident Databases, Plant Layout and Equipment Spacing Core	Core	Released
PRS-SIS-1	SIS, Monitoring and Control Core	Core	Released
PRS-FPS-1	Fire Protection Systems Core	Core	Released
PRS-RAI-2	Risk Analysis and Inherently Safer Design Fundamentals	Fundamental	Released
PRS-PHA-2	PHA Techniques and LOPA Fundamentals	Fundamental	Released
PRS-LDC-2	Leakage and Dispersion, Combustion Behavior, Sources of Ignition Fundamentals	Fundamental	Released
PRS-HID-2	HID and Metrics, Bad Actors (Specific Systems) Fundamentals	Fundamental	Released
PRS-RFD-2	Relief, Flare, and Depressurization Fundamentals	Fundamental	Released
PRS-CSI-2	Controls and Safety Instrumented Systems Fundamentals	Fundamental	Released
PRS-SLF-2	Spacing and Layout, Fire Protection Fundamentals	Fundamental	Released
PRS-GOW-1	Gas, Oil, and Water Composition and Properties Core	Core	Released
PRS-OWS-2	Oil-Water Separation Fundamentals	Fundamentals	Released
PRS-OTR-2	Oil Treating and Desalting Fundamentals	Fundamentals	Coming Soon
PRS-WAS-2	Surface Sand Handling, Hydrates Inhibition, Wax, Asphaltenes, and Scale Fundamentals	Fundamentals	Coming Soon

Mechanical Engineering			
MEC-MEC-1	Mechanical Equipment Core	Core	Released
MEC-PMC-1	Properties of Materials Core	Core	Released
MEC-PSW-1	Piping Systems and Welding Core	Core	Released
MEC-UPV-1	Unfired Pressure Vessels Core	Core	Released
MEC-FHB-1	Fired Heaters and Boilers Core	Core	Released
MEC-STC-1	Storage Tanks Core	Core	Released
MEC-CCC-1	Corrosion Control and Protection Core	Core	Released
MEC-REE-1	Reciprocating Engines, Electric Motor Drivers and Generators Core	Core	Released
MEC-GST-1	Gas and Steam Turbines Core	Core	Released
MEC-MDM-1	Machinery Design, Materials and Subsystems Core	Core	Released
MEC-MEI-1	Mechanical Equipment Inspection, Operation and Maintenance Core	Core	Released
Instrumentation and Controls			
INC-CS1-1	Control Systems for Oil and Gas Applications Core (Part 1)	Core	Released
INC-CS2-1	Control Systems for Oil and Gas Applications Core (Part 2)	Core	Released
INC-ISO-1	Instrumentation Selection for Oil and Gas Applications Core (General)	Core	Released
INC-ISF-1	Instrumentation Selection for Oil and Gas Applications Core (Flow)	Core	Released
INC-ISL-1	Instrumentation Selection for Oil and Gas Applications Core (Level)	Core	Released
INC-ISP-1	Instrumentation Selection for Oil and Gas Applications Core (Pressure, Temperature)	Core	Released
INC-ISA-1	Instrumentation Selection for Oil and Gas Applications Core (Analysis)	Core	Released
INC-CVO-1	Control Valves for Oil and Gas Applications Core	Core	Released
Electrical Engineering			
ELE-EDI-1	NEC-Based Electrical Design, Installation and Safety Codes Core	Core	Released
ELE-PR1-1	Principles of Power Systems in Oil and Gas Applications Core (Part 1)	Core	Released
ELE-PR2-1	Principles of Power Systems in Oil and Gas Applications Core (Part 2)	Core	Released
ELE-HAZ-1	Hazardous Area Classification and Installation in Oil and Gas Facilities Core	Core	Coming Soon
ELE-SAF-1	Electrical Safety in Design for Oil and Gas Facilities Core	Core	Coming Soon
Pipeline Engineering			
PIP-POM-1	Pipeline O&M, Leak Detection, Repairs, Alterations and Abandonment Core	Core	Released
PIP-PRG-1	Pipeline Routing and Geomatics Core	Core	Released
PIP-CPE-1	Compliance and Pollution Events and Environmental Impacts and Assessments Core (U.S. Focus)	Core	Released
PIP-PHF-1	Pipeline Hydraulics and Flow Assurance Core	Core	Released
PIP-PSS-1	Pipeline Strength, Stability and Environmental Considerations Core	Core	Released
PIP-PCS-1	Pipeline Pump and Compressor Stations and Terminals Core	Core	Released
PIP-PIC-1	Pipeline Construction Core	Core	Released
Net Zero and Renewables			
CCA-CCU-1-N	Carbon Capture, Utilization and Storage Core	Core	Coming Soon

Net Zero and Renewables (*Continued*)			
MUL-AFC-1-B	Alternative Fuels Core	Core	Released
SOL-SPG-1-R	Solar Power Generation Core	Core	Released
WIN-WPG-1-R	Wind Power Generation Core	Core	Released
MUL-BAR-1-B	Business Aspects of Global Warming and Alternative Energies	Core	Coming Soon
GRN-DBN-1-N	The Drivers Behind Net-Zero Core	Core	Released
MUL-EPG-1-B	Existing Power Generation Technologies with Alternative Energies Core	Core	Coming Soon
EST-ESC-1-R	Energy Storage Core	Core	Released
MUL-CPF-1-B	Coherent Planning for the Future Core	Core	Coming Soon

Skill Module Descriptions by Discipline

E&P Industry and Asset Life Cycle Core [IAM-EIA-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 5 min

In this skill module, you will learn about asset life cycle economics and the phases of the asset life cycle, including exploration; appraisal; development; and production, including mature production and enhanced oil recovery. You will also learn about the historical, geographical, and modern context of the petroleum industry; its organization, the petroleum value chain; and economic drivers.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- Historical petroleum occurrences and usage
- The phases of the E&P asset life cycle
- The objectives and processes of the exploration phase of the E&P asset life cycle
- The objectives, processes, and economic metrics of the appraisal phase of the E&P asset life cycle
- The objectives and processes involved in the development and production phase of the E&P asset life cycle
- The objectives and processes involved in the mature production phase in the E&P asset life cycle
- Basic reserves and production value concepts

Petroleum Geology Core [IAM-PGC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 35 min

In this skill module, you will learn about Earth structure and plate tectonics; types of rocks, the rock cycle, clastic, biogenic, and chemical source sedimentary rocks; historical geology depositional environments; and global versus regional stratigraphy.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- The Earth's structure, continental drift, and plate tectonics role in oil and gas exploration
- Rock types and classification in an oil and gas context
- The relationship between depositional environments and geological settings
- The importance of historical geology to finding oil and gas accumulations
- The relative age of rocks and how we date the rocks and understand the paleo climate
- The relationships between global and regional stratigraphy

Hydrocarbon Reservoirs Core [IAM-HRC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 10 min

In this skill module, you will learn about basins and plays, unconventional resources, and petroleum systems. You will also learn about structural stratigraphic traps and reservoir mapping.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- Exploration concepts
- Elements of a successful petroleum system
- Key differences between unconventional and conventional petroleum systems
- Different types of structural traps
- Different types of stratigraphic traps
- Features of structural contour and isopach maps

Rock and Fluid Properties Core [IAM-RFP-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 35 min

In this skill module, you will learn about reservoir rock properties: porosity and permeability, grain size, distribution, and sorting. You will also learn about reservoir fluids, physical and chemical properties, and the impact on these properties at reservoir and surface conditions. Reservoir classification and phase diagrams are also discussed. In the Hydrocarbon Recovery section, you will learn about primary recovery drives such as dissolved gas (solution gas) drive, water drive, gas cap expansion drive, and combination drives. You will also learn about enhanced oil recovery, including secondary and tertiary recoveries such as water flood, miscible flood, steam cycle, and steam drive, along with expected recovery efficiencies.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- The basic reservoir rock properties and the significance of core samples
- The factors that affect porosity and how it is measured
- The factors that affect permeability and how it is measured
- How grain size, distribution, and sorting controls reservoir quality
- How to estimate reservoir economic potential
- The fundamental classification of hydrocarbons as paraffin, naphthene, and intermediate series
- API gravity classification and nomenclature for different crudes
- Reservoir conditions and stock tank conditions and their effect on reservoir fluids
- The relationship between fluid properties and phase behavior
- The importance of phase diagrams to understanding reservoir behavior
- How to differentiate conditions expressed on a phase diagram
- How to relate fluid properties and phase diagram conditions to "our reservoir"

Surface/Subsurface Exploration Core [IAM-SSE-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 10 min

In this skill module, you will learn about basins, plays and risk analysis, mineral ownership, and contracts; and surface exploration technologies, such as gravity, magnetic and geochemical surveys and seismic imaging and interpretation. Subsurface technologies such as mud logging, appraisal wells, coring, well logging, and drill stem testing.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- The roles involved in exploration
- About basins, plays, leads, prospects, and geological risk
- Different types of oil and gas contracts
- The purpose and types of surface exploration technologies
- The purpose and function of seismic surveys
- The basic structural information from a seismic survey
- The role of exploration and appraisal wells
- Formation evaluation tools used during the exploration phase, including mudlogging and LWD, well logging and cores, and well tests (DST)

Drilling Operations and Well Completions Core [IAM-DOW-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 25 min

In this skill module, you will learn about well function, onshore and offshore drilling, drilling programs, drilling rig components, and drilling systems (including drilling, rotating, fluid, and blowout prevention systems). You will also learn about casing and cementing, wellhead installation, types of well completions, formation damage, well perforation, sand control strategies, and well stimulation.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- The advantages and disadvantages of early and modern types of drilling styles
- Rig type classification and selection for onshore and offshore drilling
- Types of platforms and techniques used for offshore rigs
- The purpose and function of non-vertical drilling, including directional and horizontal drilling
- The components of a drilling system
- The components of a drilling rig
- The drilling systems of a rig
- The purpose and function of the rotating system
- Drilling fluid properties and function
- Purpose and function of blowout preventers
- Purpose of casing and cementing
- Purpose and function of the wellhead
- Overview of different types of well completions
- Formation damage
- Methods of well perforation
- Sand production problems and control strategies in reservoirs
- Common well stimulation strategies

Production Operations Core [IAM-POC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs

In this skill module, you will learn about production roles, artificial lift (including beam pumps, gas lift, and submersible pumps), production logging, and workover operations. You will also learn about the integrated production system, fluid separation, emulsion breaking, crude products, gas separation and natural gas processing, NGL usage, and natural gas conversion to LNG and GTL.

Designed for

Those who need to achieve a context and understanding of E&P technologies, or the role of technical departments in oil and gas operations, and/or be able to understand and use the language of the oilfield.

You will learn

- The contrasting roles of reservoir and production engineers
- The different types of artificial lift
- The purpose of production logging and workover operations
- How the integrated production system prepares hydrocarbons for transportation
- About oil separation and processing
- About gas separation and processing
- How natural gas is distributed

Defining Well Objectives Core [IAM-DWO-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 5 min

This skill module provides an overview of how various well objectives contribute to the understanding of the asset. Key stakeholders and the activities that impact the well plan are discussed. Also explained in this skill module are why well objectives change over the life of the asset and the commonly used key performance metrics for the drilling discipline.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify stakeholders in an effort to define well objectives
- Explain how various well objectives contribute to understanding of the asset
- Identify activities focused on achieving well objectives and how they may impact the well plan
- Explain why well objectives change over the life of the asset
- Identify commonly employed performance metrics for the drilling discipline

Bits and Hydraulics Core [IAM-BHC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 25 min

This skill module addresses roller cone and fixed cutter bit design features and their associated hydraulics programs at an awareness competency level.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify design features and selection criteria for roller cone bit types
- Explain failure modes for roller cone bits and how this information can be used to improve performance
- Identify design features and selection criteria for fixed cutter bit types
- Explain failure modes for fixed cutter bits and how this information can be used to improve performance
- Explain tool system options which allow wellbore enlargement to a diameter greater than the internal drift diameter of a previously installed casing string
- Discuss situations where this may be required
- Explain rotary coring bit options
- Explain the relationship between cost per foot of a bit run and the cost of a bit, its rate of penetration, footage drilled, and the cost of the drilling operation
- Determine optimum time to pull a used bit based upon its cost per foot trend
- Balance competing objectives for the drilling hydraulics system
- Maintain ECD below fracture pressure of open hole
- Select nozzle sizes for adequate bit hydraulics
- Maintain operating pressure and total pump power demands within rig capabilities

Drill String and BHA Core [IAM-DSB-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 5 min

This skill module explains the various drill string components and their purpose. The skill module also explains the performance properties of drill strings, how to diagnose drill string mechanisms, and the steps to prevent drill string failures.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify drill string components and their suppliers
- Explain the purposes of the various drill string components
- Determine drill string performance properties
- Diagnose drill string mechanisms
- Identify steps to prevent drill string failures

Drilling Fluids and Solids Control Core [IAM-DFS-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 35 min

Drilling fluids are the “life-blood” of drilling operations and comprise a wide-range of functions including suspension of formation cuttings, maintaining wellbore integrity, downhole pressure control and others. The proper selection of a drilling fluid can allow optimum performance in each of these areas as well as meeting environmental guidelines and performance objectives. The successful removal of solids from the fluid allows cost-effective maintenance of fluid properties and overall reduced well costs. This skill module addresses these topics at an awareness level.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify functions of drilling fluids
- Explain fluid types and their selection criteria
- Identify fluid properties, how they are measured, and additives used to control them
- Explain benefits of solids control, solids control equipment function, and system configuration

Directional Drilling and Trajectory Design Core [IAM-DDC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 33 min

Directional drilling may be considered the "intentional, controlled deflection of a wellbore to intersect pre-determined targets." In the early days when wooden derricks were erected so close that they touched each other, wellbores that were believed to be vertical occasionally intersected nearby wellbores, proving that the wells were in fact deviating from vertical. This was not directional drilling because this behavior was neither intentional nor controlled. Modern directional drilling is based on an understanding of the reservoir and how the wellbore should be constructed for its proper placement in the reservoir for optimum productivity.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Describe the objectives of directional drilling
- Recognize trajectory design options and selection criteria for given surface and downhole requirements
- Clarify trajectory measurement and wellbore position calculation techniques and limitations

Basic Petroleum Geology – Introduction Core [GEO-GOC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 55 min

This introductory skill module is an overview of Petroleum Geology and the Petroleum System Concept. The purpose is to familiarize learners with basic aspects of Petroleum Geology and the role of the Petroleum Geologist in the overall process of Petroleum Exploration and Production, for both Conventional and Unconventional Resources.

Designed for

Petroleum industry personnel in need of basic geological training, including engineering, geophysical, technical support, and administrative personnel.

You will learn

- The main elements and processes that comprise the petroleum system
- The basics of reservoir fluids—oil, gas, and water
- The phases and stages of exploration, field development, and production for conventional oil and gas fields
- The main phases of the exploration and development process for unconventional resources
- Key technological developments in the history of the oil and gas industry and their impact on petroleum geology

Basic Petroleum Geology – Foundation Geological Concepts Core [GEO-FGC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 37 min

This module introduces basic geological concepts that form the foundation for petroleum geology. There are three sections:

1. The Rock Cycle, focusing on the rocks and minerals that comprise the Earth's crust
2. Geologic Time and Stratigraphy
3. Plate Tectonics and Sedimentary Basin Evolution

Knowledge of these basic geologic concepts is crucial preparation for understanding petroleum geology in the overall process of petroleum exploration and production for both conventional and unconventional resources.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The Rock Cycle, including the three kinds of rocks and how they form
- How to differentiate between a mineral and a rock, and how to distinguish one mineral from another based on physical properties
- Key concepts of geological time and the difference between relative and radiometric geological time
- Stratigraphic principles and the difference between lithostratigraphy and chronostratigraphy
- How sequence stratigraphic analysis aids in the characterization of petroleum systems
- Key concepts of plate tectonics, including seafloor spreading and plate margin types
- The main types of sedimentary basins and their evolution in the context of plate tectonics

Basic Petroleum Geology – Sedimentary Petroleum Geology – Depositional Controls for Clastic Reservoir Rocks Core [GEO-SGC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 50 min

The basic concepts of Sedimentary Geology, including depositional controls for sedimentary rocks, form an essential part of the foundation for Petroleum Geology. Reservoir Rock is one of the essential elements of a Petroleum System, and because Reservoir Rock quality and thickness attributes are often closely tied to depositional origin, Geologists need to understand the main depositional controls and be knowledgeable of key depositional environments in order to properly characterize Reservoir Rocks and predict their distribution. This module introduces depositional controls and the main depositional environments for Clastic Reservoir Rocks, a category that comprises mainly sandstone and conglomerate.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The main depositional controls for clastic (e.g., sandstone) reservoir rock distribution
- Categories and classification systems for clastic rocks
- To describe the models for key depositional environments of clastic rocks, including onshore river and desert settings, marginal marine beach and delta settings, and deep water submarine fan settings
- To distinguish the grain size characteristics of clastic deposits in different settings and describe the implications for reservoir quality and trends

Basic Petroleum Geology – Sedimentary Geology – Depositional Controls for Carbonate Reservoir Rocks Core [GEO-SGD-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 20 min

The basic concepts of Sedimentary Geology, including depositional controls for sedimentary rocks, form an essential part of the foundation for Petroleum Geology. Reservoir Rock is one of the essential elements of a Petroleum System, and because Reservoir Rock quality and thickness attributes are often closely tied to depositional origin, Geologists need to understand the main depositional controls and be knowledgeable of key depositional environments in order to properly characterize Reservoir Rocks and predict their distribution. This module introduces depositional controls and the main depositional environments for Carbonate Reservoir Rocks. Important post-depositional diagenetic processes affecting Carbonate Reservoir Rock quality are also introduced.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The main depositional controls for carbonate (e.g., limestone) reservoir rock distribution and how they differ from clastics (e.g., sandstone)
- Classification system for carbonate rocks
- To describe the models for key depositional environments of carbonate sediments
- To distinguish the textural characteristics of carbonate deposits in different settings and describe the implications for reservoir quality and trends
- The main diagenetic processes affecting carbonate rocks and their impact on reservoir quality

Basic Petroleum Geology – Petroleum System – Overview and Source Core [GEO-RFS-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 45 min

This skill module is presented in two parts. The first part provides an introduction and overview of the petroleum system concept. The essential elements and processes of a petroleum system are summarized, and the importance of their timing is emphasized and explained. The second part explains the basic concepts of source rock characteristics and quality, as well as the processes of source rock thermal maturation and hydrocarbon generation. The main depositional controls for both siliciclastic shale and carbonate source rocks are also introduced.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The basic elements and processes of the petroleum system concept
- The characteristics of high-quality source rocks and the concepts to TOC% (Total Organic Carbon Content) and kerogen type
- The differences between oil and gas source rocks
- The different measures for source rock maturity and how these are used to define the hydrocarbon generation history of source rock units
- The main depositional controls for clastic and carbonate source rocks and the importance of anoxic conditions for the accumulation of organic source rock material

Basic Petroleum Geology – Petroleum System – Reservoir and Seal Core [GEO-RSC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 5 min

This skill module is presented in two parts, focusing on two essential elements of the Petroleum System. The first part explains the basic concepts of reservoir rock characteristics and describes key depositional and post-depositional factors impacting reservoir quality. Clastic, carbonate, and naturally fractured reservoirs are introduced, including field examples. The second part explains the basic concepts of seal rock characteristics and quality. Different types of seals, including fault seals, are considered and depositional controls for examples of key seal lithologies are described.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The concepts of reservoir porosity and permeability
- Controls on reservoir quality by texture
- Post-depositional and diagenetic processes that affect Reservoir Quality
- Classification systems for clastic and carbonate reservoir rocks
- The concept of net pay
- The different types of naturally fractured reservoirs and the concept of dual porosity systems
- The concepts of seal rock characteristics and quality
- The different types of fault seals, including juxtaposition and fault smear seals

Basic Petroleum Geology – Petroleum System – Trap and Timing Core [GEO-TTC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 55 min

This skill module is presented in two parts, focusing on two essential processes of the Petroleum System. The first part begins by covering basic concepts of structural geology and then explains the essential process of petroleum trap formation. Both structural and stratigraphic traps are described with field examples provided. The second part explains the essential process of hydrocarbon generation and migration, emphasizing the importance of the timing of the process relative to the timing of trap formation.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in petroleum exploration and production who needs to understand petroleum geology concepts at a basic level or to communicate with others about it.

You will learn how to

- Identify, describe, and understand the formation of key geological fold and fault structures
- Describe principle stress configurations and the implications for the orientation of fractures and faults
- Explain the concept of strike and dip for characterizing the orientation of geologic strata and structures
- Explain the difference between structural and stratigraphic trap
- Recognize uncertainties associated with fault trap
- Describe the types of structural traps associated with extensional, compressional, and strike slip tectonic settings
- Explain the meaning of timely maturation and migration and the concept of “critical moment” for a petroleum system

Basic Petroleum Geology – Petroleum System – Examples Core [GEO-EXC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 55 min

To reinforce the petroleum system concepts presented in other Basic Petroleum Geology – Petroleum System skill modules, this module describes examples of petroleum systems. The first part focuses on examples of Marine Basin Petroleum Systems, characterized by marine shale source rocks. The second part of the module provides an example of a Terrestrial Basin Petroleum System, characterized by a lake or lacustrine shale source rocks.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in petroleum exploration and production who needs to understand petroleum geology concepts at a basic level or to communicate with others about it.

You will learn how to

- Describe the North Sea Central Graben as an example of a vertically drained marine basin petroleum system
- List elements of the North Sea Central Graben petroleum system, explain its timing, and define its critical moment
- Describe the Ekofisk Field as an example of the North Sea Central Graben petroleum system
- Describe the East Venezuela Basin as an example of a laterally drained marine basin petroleum system
- Describe the Songliao Basin, NE China as an example of a terrestrial basin petroleum system
- List elements of the Songliao Basin petroleum system, explain its timing, and define its critical moment
- Describe the Daan Field as an example of the Songliao Basin petroleum system

Basic Petroleum Geology – Phases of Conventional Exploration and Development Core [GEO-PCE-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 40 min

This module explains the Exploration and Production (E&P) Cycle. In the first part of the module, a brief overview of the Exploration and Production (E&P) Cycle is given. In the second part of the module, the Exploration Phase of Conventional Projects is described, including the progression from regional basin studies to Exploration Play Concept development, the delineation of Exploration Leads, and the definition of drillable Prospects. The third part of the module describes the Conventional Field Development process, which consists of four Stages: 1) Discovery and Initial Appraisal of the accumulation, 2) Full Appraisal, 3) Primary Development of the field, and 4) Enhanced Recovery.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in petroleum exploration and production who needs to understand petroleum geology concepts at a basic level or to communicate with others about it.

You will learn how to

- Explain the concept of the Exploration and Production or E&P Cycle
- Understand the steps in the Exploration Process and the work done in each:
  - Play Concept Definition
  - Lead Identification
  - Prospect Definition
- Describe the four Stages of Conventional Field Development:
  1. Discovery and Initial Appraisal
  2. Full Appraisal
  3. Primary Development
  4. Enhanced Recovery
- Understand the concept of Reservoir Flow Units as the basis for a common industry technique of reservoir zonation

Basic Petroleum Geology – Tools and Techniques Core [GEO-GTT-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 15 min

This module explains basic concepts of key tools and techniques used by geoscientists in the exploration and development of petroleum resources. Topics covered include seismic data, drilling and completions, and formation evaluation. The main points of horizontal drilling and hydraulic fracturing, which are widely used in the development of unconventional resource plays, are presented. Also covered in this module is the estimation of reserves and resources.

Designed for

Petroleum industry personnel in need of basic geological training, including engineering, geophysical, technical support, and administrative personnel.

You will learn

- The basics concepts of 2D and 3D Seismic Data and how it is used to investigate the subsurface
- How seismic data is acquired, processed, and displayed for visualization and interpretation
- How to identify various types of drilling rigs and key pieces of equipment used in drilling, including bits and how they function
- How to understand the main points of the drilling process, including the basics of horizontal and directional drilling
- The basics of how a well is completed, including through hydraulic fracturing and other techniques of reservoir stimulation
- How rock and hydrocarbon information is gathered during the drilling of a well through mudlogging, coring, wireline logging, and testing
- To basic concepts of reserves and resource estimation
- How to use the Volumetric Method to estimate Hydrocarbons in Place

Basic Petroleum Geology – Unconventional Petroleum Resources Core [GEO-UPR-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 10 min

This skill module introduces the petroleum geology of Unconventional Resources, which are an increasingly important part of the oil and gas industry.

The first part of the skill module explains the basic concepts of unconventional resources, and the key differences between conventional fields and unconventional resources. The geology and technological factors controlling productivity for unconventional resources are described, and essential operational technologies, including horizontal drilling and multistage hydraulic fracturing are discussed.

To highlight and reinforce the basic concepts of unconventional shale resource plays, the second part of the skill module focuses on two case studies; first, the Eagle Ford Shale Play of southeast Texas; and second, the Niobrara Shale Play of Colorado-Wyoming, as an example of a “shale hybrid play.”

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn how to

- Explain what is meant by an Unconventional Resource and how it differs from a Conventional Field
- List the geologic factors controlling productivity of Unconventional Resource plays
- Recognize the importance of Geomechanical Factors, in particular Stress Field Orientation
- Describe key aspects of Horizontal Drilling and Hydraulic Fracturing technologies as they relate to Shale Resource Plays
- Explain the concept of a Shale Hybrid Play
- Describe key technical developments that have led to increased productivity from Shale Plays and be cognizant of World Oil and Gas Shale Resource Estimates

Introduction to Geosteering Core [GEO-IGE-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 54 min

This skill module is presented in two parts, focusing on two essential elements of the Petroleum System. The first part explains the basic concepts of reservoir rock characteristics and describes key depositional and post-depositional factors impacting reservoir quality. Clastic, carbonate, and naturally fractured reservoirs are introduced, including field examples. The second part explains the basic concepts of seal rock characteristics and quality. Different types of seals, including fault seals, are considered and depositional controls for examples of key seal lithologies are described.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn

- The concepts of reservoir porosity and permeability
- Controls on reservoir quality by texture
- Post-depositional and diagenetic processes that affect Reservoir Quality
- Classification systems for clastic and carbonate reservoir rocks
- The concept of net pay
- The different types of naturally fractured reservoirs and the concept of dual porosity systems
- The concepts of seal rock characteristics and quality
- The different types of fault seals, including juxtaposition and fault smear seals

Introduction to Gridding for Computer-based Subsurface Mapping Core [GEO-IGC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 6 min

This skill module is presented in two parts, focusing on two essential processes of the Petroleum System. The first part begins by covering basic concepts of structural geology and then explains the essential process of petroleum trap formation. Both structural and stratigraphic traps are described with field examples provided. The second part explains the essential process of hydrocarbon generation and migration, emphasizing the importance of the timing of the process relative to the timing of trap formation.

Designed for

Geoscience professionals and support staff who generate structure, isochore, and other subsurface maps using interpretation or mapping software.

You will learn how to

- Identify, describe, and understand the formation of key geological fold and fault structures
- Describe principle stress configurations and the implications for the orientation of fractures and faults
- Explain the concept of strike and dip for characterizing the orientation of geologic strata and structures
- Explain the difference between structural and stratigraphic trap
- Recognize uncertainties associated with fault trap
- Describe the types of structural traps associated with extensional, compressional, and strike slip tectonic settings
- Explain the meaning of timely maturation and migration and the concept of “critical moment” for a petroleum system

Interpreting Siliciclastic Environment of Deposition (EOD) for Deltaic Systems Core [GEO-ISE-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 59 min

This skill module takes the participant through the concepts and general workflow of interpreting the environment of deposition (EOD) for siliciclastic deltaic systems using data sets including logs, core, and seismic. The process of interpreting the EOD is one of integrating datasets of varying types, scales, and data density into a holistic understanding of a given stratigraphic interval. An EOD allows one to understand deposition at the field/reservoir scale, but also to predict reservoirs at both the development and exploration scales. The concepts of facies, sequence stratigraphy, log and seismic correlation, depositional controls, and types of deltas are discussed and applied to example data sets from different deltaic systems in the module.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and any team members involved in drilling a directional well who need to understand geosteering concepts at a basic level or to communicate with others about it.

You will learn how to

- Understand and apply the process of interpreting a deltaic EOD
- Apply concepts and tools to datasets that are typically used for deltaic depositional environments
- Be familiar with typical EODs for different types of deltaic systems and understand their differences
- Apply tools and concepts for assessing appropriateness of an EOD analogue and modifying them to a specific deltaic system
- Apply concepts for developing a data collection strategy to improve the EOD

Seismic Image and Geological Association with Seismic Reflections Core [GEP-SIG-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 9 min

This skill module explains at the awareness level how to identify a seismic image and how it relates to geology. Also explained are how seismic images are formed and displayed, and the differences in analyzing seismic images in time and depth domains. This skill module is designed to explain the basics of the seismic process.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Differentiate between depth and time
- Identify how a seismic image is displayed
- Describe how a seismic image is formed
- Identify a seismic image
- Explain how a seismic image relates to geology
- Changes in lithology
- Velocity and density
- The influence of porosity and pore filling material

Wavelets and Seismic Velocities Core [GEP-WSV-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 47 min

This skill module explains why the vertical resolution of the seismic data is a critical issue and how the resolution is controlled by the propagating wavelet that is generated by the acquisition parameters. The skill module also discusses the recorded wavelet and its phases and the data display polarity and display conventions. Also explained is how velocity can be estimated by the seismic image construction and used as an approximation to derive a depth converted geologic model from time imaged seismic or a depth image seismic. It covers how to directly measure depth versus vertical seismic travel time through Check Shot Surveys and Vertical Seismic Profiles and how vertical seismic profiling can be extended to 2, 3, and even 4 dimensions to tie the other direction of velocity to the seismic image.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Identify why the vertical resolution of the seismic data is a critical issue
- Explain how the resolution is controlled by the propagating wavelet that is generated by the acquisition parameters
- Identify the recorded wavelet and its phase
- Describe the data display polarity and display conventions
- Identify seismic imaging velocities and how they are used to construct the seismic image
- Describe how imaging velocities are derived from the stacking process
- Describe velocity spectrum and how it applies to stacking and migrating the data
- Explain the relationship between depth and time and the ambiguity between the two domains
- Recognize overpressure in the seismic data
- Identify the jargon associated with anisotropy
- Recognize how a vertical seismic profile directly measures the time to depth relationship at various depths in a well bore and how that facilitates tying it into seismic

Seismic Acquisition, Processing and Migration Core [GEP-SAP-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 10 min

This skill module explains the seismic data acquisition process and components for marine and land data. Also included is a comparison of the costs of seismic data acquisition for marine and land data. It also explains the concept of seismic processing flow and deconvolution. The skill module also explains what the processors do to produce the seismic image. Finally, we discuss the process of forming the seismic image by migration. There are several ways to migrate the data, including post-stack, pre-stack, time, and depth migration. For this skill module, Kirchhoff migration is used as a word picture for the process of allowing constructive and destructive interference to build the migrated image. Other methods will be discussed with their pros and cons.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Describe the marine configuration for a 3D survey including:
  - Components used for data acquisition
  - Arrays to attenuate noise
  - Bin gathering as a CMP assemblage of reflections
- Describe the land configuration for a 3D survey including bin gathering for a land 3D survey
- Compare the costs of 2D and 3D surveys
- Describe processing flow
- Explain the concept of deconvolution
- Identify what the processors do to produce the seismic image

Seismic Mapping Core [GEP-SEM-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 57 min

This interpretation exercise incorporates all aspects, from start to finish, in interpreting a 3D data set, including the final conversion to depth. Several discussion points on tying faults and the style of contouring are included.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Identify the layout of a 3D seismic survey
- Turn the interpretation into a data reduction process resulting in an interpretation and a structural map originally in time

Direct Hydrocarbon Indicators and Amplitude versus Offset Core [GEP-DHI-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 31 min

This skill module explains that the effect of hydrocarbons as a pore filling material in our seismic data is at the core of seismic interpretation. This skill module also includes a section on rock physics. Amplitude variation with offset is used to modify risk in hydrocarbon prospects. This skill module introduces the concept, process and application of the technology.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Explain the effect of hydrocarbons in the seismic data
- Detect hydrocarbons in the seismic data
- Describe rock physics
- Define amplitude variation with offset/angle (AVO/AVA)
- Make approximations to the Zoeppritz equations, including
  - Aki-Richards equation
  - Shuey's equation
- Identify the Rutherford and Williams classification
- Describe slope, intercept, and the fluid line
- Describe the methods for prestack inversion, including
  - Simultaneous Inversion;
  - Elastic Impedance and Extended Elastic Impedance;
  - Lambda Rho and Mu Rho

Seismic Inversion and Attributes Core [GEP-SIA-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 40 min

What is done to the data is very simple, but the impact on our interpretation has become a huge issue. In this skill module, we learn to 'inverse' the seismic data into a rock property, specifically impedance. Also discussed are the types of inversion algorithms and their application.

Seismic data is typically not viewed in frequency or phase domain, but they are becoming popular displays. This skill module introduces the concept of attributes and explains what they are and how they are used to determine prospectivity of hydrocarbons.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Explain the seismic inversion processes, both forward and inverse
- Identify relative and absolute impedance in seismic inversion
- Identify the inversion algorithms and their application
- Define attributes
- Identify the importance of attributes
- Describe spectral decomposition attributes
- Explain spectral notching
- Identify the concepts of attenuation and Q
- Describe the Hilbert Transform attributes
- List the multi-trace attributes
- Describe the coherency attribute
- Describe the curvature attribute
- Explain the application of self-organizing maps in predicting reservoir rock properties
- Identify the duplicity of attributes
- Relate how the application of attributes is far more important to know than the different types of attributes

Seismic for Unconventional Reservoirs Core [GEP-SUR-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 7 min

This skill module explains why unconventional reservoirs are becoming increasingly important and how we can use conventional geophysical tools for their analysis. We also learn that 'brittleness' is the most important rock physics property and how to perform seismic analysis for unconventional reservoirs properties to contribute to sweetspot highgrading. Finally, the skill module explains the concept of microseismic recording, microseismic monitoring, and explains how the microseismic is interpreted using Hodograms in source orientation determination.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Identify rock physics for shale reservoirs
- Describe seismic analysis for unconventional reservoirs
- Describe microseismic, including surface and subsurface recording arrays
- Describe source (event) recording and location detection
- Describe three component recording
- Identify the role of Hodograms in source orientation
- Identify the importance of microseismic monitoring in different stress areas

Introduction and Overview of Petrophysics Core [PPH-IOP-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 1 min

This module introduces key concepts in petrophysics and provides an overview of how petrophysics is used in a variety of E & P applications. Topics include types of well data and data gathering, such as mud logs, MWD/LWD logs, wireline logging, coring, and core analysis. This module explains how common logging tools work and how they are used. Various petrophysical workflows are reviewed that integrate petrophysical data for common applications, including volumetric assessments. The knowledge gained in this module will give you the ability to comfortably work through complex datasets in many petrophysics topics.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data and other technical staff at all experience levels wanting a fundamental background in the petrophysics discipline.

You will learn how to

- Describe petrophysics and explain petrophysical applications in other subsurface specialties (Geology, Geophysics, Reservoir Engineering, Drilling Engineering)
- List and describe important petrophysical properties
- Explain the collection, types, and applications of petrophysical data including
  - Mud logging
  - Measurement while drilling (MWD)
  - Logging while drilling (LWD) and wireline logging, including differences and similarities
  - Core sampling, including the advantages and disadvantages of different types of sampling
  - Routine core analysis (RTA) and special core analysis (SCAL)
  - Fluid sampling and pressure data (wireline)
- Define petrophysical rock types and describe the basic relationships between petrophysical properties and depositional environment
- Define and describe the methodology of determining net sand, net pay, and water saturation for volumetric calculations

Mud Logging, Coring, and Cased Hole Logging Core [PPH-MLC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 21 min

This skill module continues the introduction to a specialized area of E&P called Petrophysics. The field operations and technologies required to identify and quantify oil and gas resources are introduced. Topics include mud logging, coring, and cased hole logging. The material presented is at the awareness competency level.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn

- About acquiring and interpreting mud log data including gas detection and drill cuttings examination to identify prospective oil and gas zones
- How representative rock samples are obtained with coring methods including whole cores and sidewall samples
- The basics of cased hole logging for reservoir monitoring, production logging, and wellbore integrity

Porosity Logging Core [PPH-PLC-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 33 min

This skill module continues the introduction to Petrophysical well logging tools and data interpretation. Topics include Density, Neutron, and Sonic “Porosity” Logs. The material presented is at the awareness competency level.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn

- The tool physics and data applications of the primary porosity well logs including the Density, Neutron, and Sonic Logs

Gamma Ray and Spontaneous Potential Logging Core [PPH-GRS-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 47 min

This skill module is an introduction to Petrophysical well logging tools and data interpretation. Topics include the Gamma Ray (GR) Log and the Spontaneous Potential (SP) log. The material presented is at the awareness competency knowledge level.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn

- The physics and applications of Gamma Ray and Spontaneous Potential log data
- Concepts of openhole logging in vertical and horizontal wells
- Gamma Ray logging tool function and applications
- Spontaneous Potential logging tool function and applications

Formation Testing Core [PPH-FTC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 15 min

This skill module is designed to teach the fundamental aspects of formation testing; increase familiarity with basic formation testing applications; increase understanding of the objectives, techniques, and equipment associated with reservoir fluid sampling; and explicate the role formation testing plays in assessing formation producibility.
Production Operations Staff, Reservoir Engineers, Facilities Staff Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers.

Designed for

Production Operations Staff, Reservoir Engineers, Facilities Staff Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers.

You will learn

- The basics of formation testing, including important terms and concepts
- The specifics of formation testing applications
- How reservoir fluid sampling is conducted
- The role of formation testing for producibility

Core Analysis Core Knowledge [PPH-CAC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 40 min

This skill module introduces the purpose of, processes, and tools for basic core measurements and special core measurements, and overviews Petrography and Mineralogy Data from cores as well as unconventional core analysis.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn how to

- Outline techniques for measurement of porosity, permeability, and saturation from cores
- Identify rules for cutting core plugs, cleaning, and preparing
- Define special core analysis and its application to petrophysics
- Explain the usage of special core analysis to determine electrical properties (m, n, Qv) and procedures to assure quality
- Describe the importance of capillary pressure and wettability; how special core analysis can determine relative permeability curves and residual saturations
- Explain basic concepts of thin section, SEM, and X-ray diffraction
- Describe scanning electron microscopy's purpose
- Define terms of core analysis, the mineralogy of the rocks, and differences when taking measurements
- Identify differences between unconventional and routine measurements and know when to apply each
- Define TOC, Maturity, and Kerogen type of source rocks

Resistivity Logging Tools and Interpretation Core [PPH-RLT-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 35 min

This skill module continues the introduction to petrophysical well logging tools and data interpretation. Resistivity logging tools including Induction logs, Laterologs, EWR tools, and Microresistivity devices as well as resistivity data are covered. Topics include depth of investigation and bed resolution, types of resistivity logs, and the effects of different mud systems.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn

- Operating tool physics and data applications of the various resistivity logging tools
- Selection criteria for which tool provides the best resistivity data for different environments (mud types, formation resistivity ranges, etc.)
- The latest Array resistivity tools
- The transverse induction device for highly anisotropic formations
- The Resistivity Logging Tools – Old Electric Logs
- Depth of investigation and bed resolution
- Induction Logs
- Laterologs
- Microresistivity Logs

Petrophysical Evaluation Core [PPH-PEC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 52 min

This skill module is an introduction to Petrophysical Evaluation which integrates the concepts and data covered in the previous modules. The porosity and resistivity data are used in the saturation model to calculate oil and gas saturations. By integrating the available mudlog, core and open hole log data, the Petrophysicist determines net pay, net to gross, porosity, and hydrocarbon saturations. These are required inputs to the Geologic (Static) model used to calculate hydrocarbon volumes in the subsurface. Also, the petrophysical evaluation data including permeability is required input into the reservoir dynamic model that is used to plan development wells and facilities and optimize production of oil and gas reservoirs.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn

- How to perform a basic petrophysical evaluation that incorporates Gamma Ray, SP, porosity, and resistivity data
- About the borehole and formation environment and the parameters required for saturation determination
- About the Archie Equations and how to calculate water saturations in any interval of interest
- About the effect of clay minerals on formation resistivity
- About the shaly sand equations used to calculate saturations in shaly sands
- About how to conduct an integrated formation evaluation

Special Petrophysical Tools: NMR and Image Logs Core [PPH-SPT-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 5 min

This skill module introduces Nuclear Magnetic Resonance (NMR) Logging, interpretation of Borehole Images and Dip Meter Data, and how permeability is measured in both logs and cores. The skill module covers NMR logging principles and interpretation and the importance and application of borehole image and dipmeter data.

Designed for

Geoscientists and engineers with less than twelve months experience using petrophysical data, Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline. This skill module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees.

You will learn how to

- Describe NMR principles: proton recession and T1 and T2 relaxation in porous media
- Describe the NMR response to pore size, free fluid, trapped water, permeability, and water cut
- Characterize tool models, similarities, differences, and operational issues
- Define NMR permeability determination and bound water versus free water
- Describe NMR saturation techniques and interpretation, including appropriate applications and limitations
- Determine permeability from conventional wireline logs
- Estimate permeability from empirical relationships
- Apply specialized tools, such as NMR and acoustic logs to estimate permeability
- Determine permeability from cores

Introduction to Petroleum Geomechanics and its Application Core [PPH-IPG-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 55 min

This introductory skill module is designed to familiarize the learners with reservoir geomechanics, its fundamentals and terminology along with exploring methodologies used for solving problems associated with different subsurface operations.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers, or anyone involved in unconventional reservoir development.

You will learn how to

- Recognize the significance of rock mechanics and petroleum geomechanics in development of hydrocarbon resources and other subsurface operations
- Identify applications of geomechanics for optimization and risk mitigation for several different subsurface operations
- Use the basic terminology of petroleum geomechanics e.g., in-situ stresses, pore pressure, failure criteria, constitutive models, fracture networks, and several other terms
- Describe the basic principles of rock mechanics and its problem-solving techniques for different geomechanical problems such as borehole stability, sand production, compaction, and subsidence, caprock integrity, hydraulic fracturing and more

Rock Mechanics Core [PPH-FRM-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 41 min

This skill module reviews essentials of rock mechanics required for the general practice of petroleum geomechanics and covers basic concepts such as stress, deformation, and failure in rocks.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers, or anyone involved in unconventional reservoir development.

You will learn how to

- Identify three main constituents of geomechanical problems: initial state, disturbing events, and mechanical response in different geomechanical problems
- Define stress tensor, effective stresses, principal stresses, and in-situ stress regimes and visual stresses in the Mohrs coordinate system
- Recognize the significance of deformation in rock mechanics and define strain tensor and different types of strains
- Describe elastic and elastoplastic constitutive models between stress and strain tensors such elastic and elastoplastic and their parameters
- Calculate dynamic elastic parameters and identify the differences between dynamic and static elastic parameters
- Recognize the importance of shear failure criteria in geomechanics and describe different linear and non-linear failure criteria and their advantages and limitations
- Read and use laboratory reports for measurement of elastic parameters and strength properties of rocks

Pore Pressure Measurement and Prediction Core [PPH-PPM-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 45 min

Pore pressure is a critical parameter for geomechanical modeling, and its proper characterization has a great importance as will be discussed in this skill module.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers or anyone involved in unconventional reservoir development.

You will learn how to

- Identify the significance of pore pressure in subsurface operations such as drilling, completion, production, etc.
- Define pore pressure in porous rock and describe the mechanical interaction between the rock matrix and fluid and explain the concept of effective stresses
- List different pore pressure regimes and explain their differences
- Recognize and explain different mechanisms that result in overpressure regimes including stress-induced, uplift, buoyancy and pressure difference, and fluid generation and fluid expansion mechanisms
- Identify and describe natural and artificial mechanisms that result in underpressure regimes
- List different methods used for pressure detection and prediction including pre-drilling, while-drilling, and after-drilling methods
- Describe the fundamentals of pore pressure measurement using well testing
- Recognize the influence of pore pressure on different rock properties, petrophysical logs and seismic attributes that can be implemented for identifying overpressuring
- Explain the influence of high pore pressure on different rock properties such as porosity, density, wave velocities, and resistivity
- Explain basic equivalent depth and ratio methods to estimate overpressuring from petrophysical logs
- Explain how drilling indicators (e.g., kicks, tight spots, gas shows, etc.), rock cavings and drilling rate are used for estimation of pore pressure
- Explain the challenges of pore pressure prediction in unconventional plays

Characterization of In-situ Stresses Core [PPH-CIC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 49 min

Probably one of the most important tasks in geomechanical characterization is finding different components of in-situ stresses as discussed in this skill module.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers or anyone involved in unconventional reservoir development.

You will learn how to

- Identify the significance of in-situ stresses in subsurface operations with examples from different subsurface operations such as drilling, hydraulic fracturing, fluid production, and waste disposal
- Identify the in-situ stress components in the Earth and verify the validity of common approaches used to simplify the in-situ stress tensor
- Describe the difference between present-day and paleo stresses and explain how natural phenomena and subsurface operations can disturb in-situ stresses
- Calculate vertical stress (Sv) from density logs and quality control and re-build the density logs when necessary
- Explain and use different methods used for identifying horizontal stress orientation such as drilling indicators, sonic anisotropy analysis, seismology and microseismic data, natural fractures, geological indicators, lab and in-situ stress tests, etc.
- List different methods used for estimation/measurement of minimum in-situ stress (Shmin) such as well tests such as mini-frac, extended leak-off test, DFIT
- Implement poroelastic modeling for estimation of the magnitudes of minimum and maximum horizontal stress (Shmin)

Laboratory Measurements of Basic Rock Mechanical Properties Core [PPH-LMB-1]

Released	Core	2 hrs 33 min

Laboratory testing is considered one of the most reliable sources for characterization of mechanical rock properties. This skill module provides a profound understanding of the laboratory tests commonly conducted in the practice of petroleum geomechanics. It explains how to efficiently understand, interpret, and use the results of these tests in geomechanical workflows.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers or anyone involved in unconventional reservoir development.

You will learn how to

- List different data sources for geomechanical characterization
- Identify different groups of laboratory tests and their differences
- Recognize the limitations and challenges of laboratory sampling and testing
- Identify the importance of compressive laboratory tests; describe unconfined and confined compressive tests and their procedures
- Determine shear failure criteria from the results of compressive laboratory tests and identify the limitations of conventional triaxial apparatus
- Describe the procedure for conducting other compressive testing apparatuses such as true triaxial and direct shear tests
- Recognize the importance of characterizing tensile strength of rocks and describe the methods used for its measurement.
- Define fracture toughness, recognize its importance, and describe different methods used for the measurement of fracture roughness
- Recognize the influence of rock anisotropy on the results of compressive and tensile laboratory tests

Laboratory and Field Measurement of Special Rock Mechanical Properties Core [PPH-LFM-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 45 min

While conventional laboratory tests provide important basic data, proper geomechanical characterization of rock properties require acquisition of important data from several other sources such as special laboratory tests and field measurements. This skill module introduces these data sources and explains their values and applications for geomechanical characterization.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers or anyone involved in unconventional reservoir development.

You will learn how to

- Recognize the importance of compressibility tests in reservoir geomechanics and identify different types of compressibility coefficients
- Describe procedures of hydrostatic and uniaxial compressibility tests in drained and undrained conditions
- Recognize the influences of (cyclic) production and injection on the mechanical response of rocks
- List the reasons for conducting non-destructive tests and the procedures for some major non-destructive tests including rebound hammer, indentation and scratch tests and list their limitations
- Explain the differences of dynamic and static measurements of elastic rock properties and recognize the importance of comparing static and dynamic elastic properties
- Describe the procedure for the ultrasonic test and calculate dynamic rock properties from the results of this test
- Recognize the influence of rock anisotropy on the results of ultrasonic tests
- Explain how acoustic emission measurements can help with the characterization of failure in rocks
- List different field measurement methods that can be used for the characterization of mechanical rock properties such as wireline logs, seismic surveys, seismic and micro-seismic monitoring and mechanical field tests

Introduction to Data-driven Workflows Core [DSA-IDW-1]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

This module introduces data-driven modeling, including its connection to machine learning. We will examine the rising applications of machine learning in different sectors of the economy and how this impacts daily life. Learners will then focus on the principle modes of machine learning with a discussion of a few select use cases where machine learning is providing new insights into data or streamlining operations. Data-driven modeling relies on quality data, and we will illustrate key steps to visualize and examine data as a central component of a machine learning workflow.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers or anyone involved in unconventional reservoir development.

You will learn how to

- Define and describe machine learning
- Discuss the adoption of machine learning and data-driven modeling in our industry, including potential strengths and obstacles
- Identify the modes of machine learning and what distinguishes each
- Recognize the main forms of supervised learning
- Conceptualize applications of supervised learning
- Describe unsupervised learning and what distinguishes it from supervised learning
- Conceptualize applications of unsupervised learning
- Identify different data types
- Recognize sampling methods and their pitfalls
- Be able to interpret various measures of univariate statistics
    - Measures of central tendency
    - Measures of spread
    - Visual representations of data
    - Handling of outliers

Reservoir Rock Properties Core [RES-RRP-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs

This skill module reviews the properties of reservoir rocks at the awareness level.

Designed for

Reservoir engineers and geoscientists who need reconcile rock properties with their interpretations of the properties of the reservoir, drilling, production and completion engineers who need to recognize how rock properties affect their respective workflows.

You will learn

- Different types of rocks
- Primary rock properties from a reservoir engineering point of view
- How rock properties are measured
- How rock property values are interpolated/extrapolated throughout the reservoir

Reservoir Rock Properties Fundamentals [RES-RRP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	7 hrs 40 min

This skill module introduces the concepts of wettability, capillary pressure and relative permeability, and discusses how they are measured and modeled for reservoir behavior description.

Designed for

Engineers and Geoscientists who need to understand how fluids compete for space in the reservoir.

You will learn how to

- Describe the concept of fluid contacts
- Describe how saturations change when crossing contacts
- Describe wettability
- Describe interfacial tension
- Describe how residual oil saturation is controlled by the interplay of different forces
- Define capillary pressure
- Explain how capillary pressure is a combination of several related phenomena
- Describe how capillary pressure can be used to explain macroscopic reservoir phenomena
- Show how collecting capillary pressure data can actually save money
- Discuss the various choices available for measuring relative permeability in the laboratory
- Discuss the various choices available for measuring capillary pressure in the laboratory
- Show how reservoir engineers model relative permeability
- Show how reservoir engineers model capillary pressure
- Describe how reservoir engineers define saturations
- Apply concepts discussed in the skill module to build relative permeability and capillary data datasets

Prerequisite

- Reservoir Rock Properties Core [RES-RRP-1]

Reservoir Fluid Core [RES-RRC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 54 min

This skill module reviews fluid properties at the awareness competency level.

Designed for

Reservoir, production, and facilities engineers who have a need to model the flow of oil, gas, and water through reservoirs, wellbores, and surface facilities; geoscientists who need reservoir fluid properties for their interpretations and calculations.

You will learn how to

- Describe how fluids change in response to changes in pressure and temperature
- Define the engineering properties of reservoir fluids
- Describe the make-up of reservoir fluids
- Describe how fluids are sampled
- Describe how fluid properties are measured in the laboratory

Reservoir Fluid Fundamentals [RES-RFF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 35 min

This skill module explores the calculation fluid properties such as formation volume factors, viscosities, and densities for a wide range of fluids under reservoir conditions.

Designed for

Reservoir, production, and facilities engineers who have a need to model the flow of oil, gas, and water through reservoirs, wellbores, and surface facilities; geoscientists who need reservoir fluid properties for their interpretations and calculations.

You will learn

- Volumetrics
- Material Balance
- Fluid Flow using Darcy's Law
- Pressure Transient Analysis
- Rate Transient Analysis
- Fluid Displacement
- Many other types of analysis

Reservoir Flow Properties Core [RES-RFP-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 42 min

This skill module discusses the extensions and limitations of Darcy's Law. This skill module also includes the application of Darcy's Law to gas an oil and how the law can be applied to homogenize to calculate effective permeability.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Explain the origin of Darcy's law and how it evolved
- State the difference between gravity and the pressure gradients, and how they play a role in determining the rate of which fluid could flow in the porous medium
- Identify the differences between the equations of Linear versus radial flow when calculating the flow
- Explain how heterogeneities affect the flow in porous medium, and how Darcy's law can be applied to homogenize to calculate effective permeability
- Differentiate between oil and gas flow
- Apply Darcy's law to gas and oil
- Calculate the amount of fluid that is flowing when you have single cell phase vs single phase oil
- Describe the Importance of non-Darcy effect on well performance
- Apply Darcy's law when calculating the rate of the of oil and gas well
- Identify the differences between layers in parallel and layers in series
- Discuss the effective permeability of both layers in parallel and layers in series
- State limitations of Darcy's law
- Assess the differences between gas and oil reservoirs
- Describe the effect of non-Darcy flow

Reservoir Flow Properties Fundamentals [RES-RFP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	8 hrs 34 min

This skill module covers multiple basic and advanced levels of topics. The topics include but are not limited to, Darcy's law, Flow Regimes, Fractured Wells, and Heterogeneous systems and Skin factor. This skill module also includes an interactive virtual phase where the learner works with the instructor virtually to analyze and solve problems.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Apply Darcy's law for radial flows
- Differentiate between oil and gas flows
- Solve simple problems for radial flow across porous medium
- Define and calculate productivity index
- Predict the inflow performance relationship for oil and gas wells
- Calculate the flow rate under different flow regimes
- Understand why productivity index changes for transient flow
- Calculate the flow rates for both oil wells and gas wells
- Understand the difference between boundary pressure and average pressure
- Understand the application of both pseudo-real pressure and pressure squared methods for gas wells in calculating the rates
- Evaluate the end of transient and the beginning of pseudo-steady state flows for circular as well as non-circular reservoirs
- Understand the importance of vertically fractured and horizontal wells
- Calculate the rates and productivity indices for vertically fractured and horizontal wells using the concept of effective well bore radius
- Understand different flow regimes encountered by vertically fractured and horizontal wells
- Evaluate efficacy of horizontal wells and compare the performance to vertically fractured wells
- Calculate the effective permeability for parallel layers
- Calculate the effective permeability for layers in series
- Evaluate the difference under linear and radial flows
- Calculate the value of skin factor using damaged zone permeability
- Evaluate the performance of a well in the presence of skin factor
- Evaluate the performance of the well with limited amount of production data
- Understand the conditions under which non-Darcy flow is important
- Evaluate the performance of gas wells in the presence of non-Darcy flow using both pressure squared and pseudo-pressure equations
- Understand the concept multi-rate test and why it is important
- Evaluate the oil well performance when the well is producing below bubble point
- Analyze and solve basic and advanced level problems

Prerequisite

- Reservoir Flow Properties Core [RES-RFP-1]

Reservoir Material Balance Core [RES-RMB-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 29 min

This skill module covers the basics of material balance. The topics included are drive mechanisms, principles of material balance, how to develop equations, and application of the material balance equation.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Describe the purpose of the material balance technique to estimate the initial hydrocarbons in place
- Differentiate between volumetric analysis and material balance technique
- State the basic principle of material balance analysis
- Describe the principles behind material balance equation
- Identify the data that is needed to apply the material balance equation and the uncertainties associated with collecting such data
- Identify the purpose of the modified black oil model in material balance equation
- State the assumptions involved in applying the material balance equation
- Identify the limitations of material balance technique
- Develop the material balance equations from the first principle
- Identify and explain the different mechanisms influencing the production of hydrocarbons and how they are incorporated in the material balance equation
- Understand the necessary equations to be used depending on the type of reservoir from which hydrocarbons produce
- Develop appropriate equations for dry gas, wet gas, condensate, volatile oil, and black oil reservoirs
- Describe modifications of material balance equations to estimate the initial oil and gas in place
- Explain the Havlena and Odeh method and the appropriate way to linearize the material balance equations
- Express the importance of water influx and how to detect the presence of aquifer based on production data
- Recognize the uncertainties associated with predicting the water influx as a function of time

Reservoir Material Balance Fundamentals [RES-RMB-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 35 min

This skill module reviews and expands on the Material Balance Core module. Included in this skill module is a detailed review of Dry and Wet Gas Reservoirs, Black Oil Reservoir, Volatile Oil and Retrograde Condensate Reservoir, and Water Influx.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Discuss the basic material balance equation and the assumptions
- Understand how the equations can be simplified based on certain assumptions and importance of mechanisms
- Relate material balance equation to different types of reservoirs
- Understand the application of material balance equation for gas reservoirs
- Consider the simplifications of material balance equation for absence or presence of different mechanisms
- Evaluate the uncertainties associated with mischaracterization of different mechanisms
- Apply various straight line manipulations for determining the gas in place for gas reservoirs
- Understand important drive mechanisms for black oil reservoirs
- Estimate the oil in place in oil reservoirs when the reservoir is
    - above bubble point
    - producing below bubble point
    - influenced by gas cap
- Quantify the uncertainties in oil place based on the assumptions in the strength of drive mechanisms
- Understand important drive mechanisms for retrograde condensate and volatile oil reservoirs
- Estimate the oil in place in both these types of reservoirs under different mechanisms
- Quantify the uncertainties in oil place based on the assumptions in the strength of drive mechanisms
- Understand the importance of water influx in the material balance calculations
- Learn how to estimate the water influx using pot aquifer as well as pseudo-steady state methods
- Understand trial and error procedure required to estimate the aquifer influx
- Recognize the uncertainties associated with the estimation of aquifer size and the strength

Prerequisite

- Reservoir Material Balance Core [RES-RMB-1]

Decline Curve Analysis and Empirical Approaches Core [RES-RSA-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 13 min

This skill module introduces the use of statistical methods in reservoir engineering. A range of applications are described, concentrating on decline curve analysis.

Designed for

Reservoir Engineers, and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn

- Perform basic statistics
- Calculate decline curve analysis
- Estimate recovery factors

Decline Curve Analysis and Empirical Approaches Fundamentals [RES-RSA-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	10 hrs 7 min

This skill module applies basic statistical methods to solve a range of common challenges in reservoir engineering. The emphasis will be on decline curve analysis and curve fitting to measured data such as relative permeability, as an example.

Designed for

Reservoir Engineers, and other professionals tasked with performing basic reservoir engineering functions.

You will learn

- Exponential, Hyperbolic, and Harmonic decline curve application
- Transient versus Pseudosteady State declines
- Effect of crossflow on the performance of layered reservoirs
- Using water-cuts, oil cuts, and water-oil ratios to calculate oil recovery
- Special considerations for gas reservoirs
- Decline curves for low permeability reservoirs
- Variation on the least-squares methods for curve fitting
- Common pitfalls for decline curve analysis

Prerequisite

- Decline Curve Analysis and Empirical Approaches Core [RES-RSA-1]

Reserves and Resources Core [RES-RRC-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 15 min

This skill module brings your attention to reserves management and the difference between resources and reserves at an awareness competency level.

Designed for

Reservoir Engineers, and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn

- The importance of integration with other disciplines
- Calculations using the volumetric formulas for gas and oil
- The importance of dividing into flow units for dynamic reserves in reservoir simulation
- Reserves management: what it is and how to do it
- The Reservoir Engineer's input to reserves and resources (R & R)
- How a Geoscientist and Reservoir Engineer work together on reserves
- The risk and uncertainty that drive reserves
- Other non-technical factors that influence R & R
- The standardized process between reserve estimates
- The ethical basis underlying R & R estimations

Pressure Transient Analysis Core [RES-PTA-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 30 min

This skill module brings your attention to pressure transient analysis concepts, equations, and terminology. These will get you started in the process of understanding and using this key technology for understanding oil and gas reservoir architecture and near-well parameters.

Designed for

Reservoir Engineers, and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn

- Pressure transient analysis concepts, terminology, equations, and objectives
- Pressure transient analysis in buildup and drawdown tests
- Time period analysis, challenges and objectives
- Semi-log and log-log analysis

Rate Transient Analysis Core [RES-RTA-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 39 min

This skill module covers five sections that include the general introduction to Rate Transient Analysis, Traditional Decline Curve Analysis, Modern Rate Transient Analysis, Unconventional Reservoirs, and Integration of Material Balance.

Designed for

Reservoir Engineers, and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Define the rate time analysis
- Distinguish between traditional pressure transient analysis and rate time analysis
- Describe the needs of the type of data which are typically used for rate time analysis
- Discuss the application of rate time analysis under transient and pseudo-steady state conditions
- Distinguish between the type of reservoir information we can obtain under transient and pseudo-steady state conditions
- Explain the use of dimensionless variables in rate time analysis
- Describe the limitations of the rate time analysis
- Distinguish between exponential, harmonic, and hyperbolic decline curves
- Explain the different parameters which impact the performance of a well
- Describe how the Economic Ultimate Recovery (EUR) is impacted by the assumptions about the type of decline method
- Explain how the traditional decline curve analysis can be extended to transient state conditions
- Describe how to extend the rate time analysis when the bottom hole pressure is not constant but a variable
- Compare both Blasingame and Agarwal type curve methods and evaluate both oil and gas wells using both these type curves
- Explain the concept of flowing material balance analysis
- Describe the application of rate time analysis for unconventional reservoirs
- Identify different flow regimes which are present for multiple fractured, horizontal wells
- Indicate important flow regimes which are typically observed in horizontal, multi-stage, fractured wells
- Determine the type of reservoir parameters we can obtain from evaluating rate time data for unconventional formations
- Indicate how the traditional decline curve analysis can be used for wells producing from unconventional reservoirs
- Describe the relationship between material balance and rate time analysis
- Explain how to combine material balance with rate equations to predict rate as a function of time
- Describe simple cases for single phase gas and oil reservoirs and predict the rates
- Indicate how the simple analysis can be extended to other complex situation

Reservoir Fluid Displacement Core [RES-RFD-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 38 min

This skill module covers immiscible, linear displacement as dispersed and segregated flow. It also discusses aquifers, coning, and vertical layering.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn

- Fluid displacement as immiscible, linear, and vertical (overcoming gravity)
- Dispersed and segregated flow
- Aquifers models
- Coning in oil/water systems, including when it is most likely to occur, and how to prevent it

Reservoir Fluid Displacement Fundamentals [RES-RFD-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	10 hrs 34 min

This skill module expands on the topics covered in Reservoir Fluid Displacement Core:

- Immiscible, linear displacement as dispersed and segregated flow
- Aquifers
- Coning
- Vertical layering

Designed for

Engineers or geoscientists who will occupy the position of reservoir engineer, and any other technically trained individual who desires a more in-depth foundation in reservoir engineering.

You will learn how to

- Calculate the breakthrough time for an oil well using a collection of different methods
- Explain how rock and fluid properties as well as reservoir geometry affect the breakthrough time
- Model the flow of two fluids concurrently through the same rock volume
- Recognize how flow rates and pressure drops vary under two phase flow
- Calculate recovery factors for reservoirs experiencing two phase flow as a function of time
- Use correlations to estimate areal and vertical sweep efficiency
- Calculate water influx into hydrocarbon reservoirs using a variety of aquifer models
- Recognize the strengths and weaknesses of popular aquifer models

Prerequisite

- Reservoir Fluid Displacement Core [RES-RFD-1]

Reservoir Simulation Core [RES-RSI-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 55 min

This skill module describes how reservoir simulations are used, what goes into them, how they do their calculations, and what comes out of them.

Designed for

Engineers and Geoscientists who interact with reservoir simulation specialists and need to evaluate the value of these models to the enterprise.

You will learn how to

- Describe what kind of data is used by a simulation run
- Describe the kinds of information that can be generated from a simulation run
- Explain, at a high level, how reservoir simulators work
- Describe how simulation models differ during the life of the reservoir
- Describe how models are classified, based on:
    - The type of input data used
    - The question the model was designed to answer

Enhanced Oil Recovery Core [RES-EOR-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 17 min

This skill module introduces secondary and tertiary recovery process. It describes how many of them work, how you can select the best one for your reservoir, and how simplified models can be used to approximate the behavior of these complex floods.

Designed for

Engineers or Geoscientists who will be working with a reservoir engineer on the development and optimization oil and gas fields. Reservoir engineers looking for an introduction or a refresher on enhanced oil recovery.

You will learn

- The differences between secondary and tertiary recovery
- The comparisons between pattern and peripheral flooding
- The life stages of a waterflood
- The differences between miscible, thermal, and chemical floods
- Screening criteria for different floods
- Rules of thumb for predicting performance
- Simplified models for predicting performance

Improved Oil Recovery Fundamentals [RES-IOR-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	5 hrs 20 min

This skill module discusses the reservoir aspects of waterflooding. It builds on the related topics from earlier modules and "fills in the blanks". Reservoir Surveillance and Reservoir Management activities specific to waterfloods are covered and the balance left to later modules to avoid duplication.

Designed for

Engineers or Geoscientists who will be working with a reservoir engineer on the development and optimization of oil and gas fields. Reservoir engineers looking for an introduction or a refresher on enhanced oil recovery.

You will learn

- Waterflood Types
  - Peripheral versus Pattern
  - Above versus Below Bubble Point Pressure
  - Above versus Below Fracture Pressure
  - High versus Low Reserves to Producing ratios
  - Normal versus Enhanced
  - Onshore versus Offshore
- Waterflood Operations
  - Modeling the Reservoir
  - Monitoring Injectors
  - Monitoring Patterns
  - Water Quality

Reservoir Surveillance Core [RES-RSC-1]

STATUS	LEVEL	DURATION
Released	Core	6 hrs 25 min

This skill module brings your attention to reservoir surveillance (RS) objectives, activities, and plans and the link to uncertainty.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn

- A surveillance plan's objectives must be aligned with asset specific tactical details
- Surveillance activities must add value and they do not after reaching a certain optimum
- How to calculate the Value of Information derived from surveillance activities
- How surveillance activities reduce uncertainty
- The surveillance plan must change constantly as asset objectives change
- The impact of the production and well environment, including well construction concepts and how this impacts RS activities
- How production allocation impacts the quality of the data and the impact of data frequency
- Measurement principles behind oil field measurements, including concepts related to precision, accuracy, and repeatability

Reservoir Surveillance Fundamentals [RES-RSF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 20 min

This skill module continues the discussion on reservoir surveillance (RS), with a focus on quality control for baseline and episodic data, data analytics, special techniques, and life of field reservoir surveillance.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- QA/QC baseline and episodic data
- Use data analytics at various scales and from laboratory to the field
- Evaluate special techniques for application in your reservoir
- Prepare your reservoir for life of field reservoir surveillance through observed case studies

Prerequisite

- Reservoir Surveillance Core [RES-RSC-1]

Reservoir Management Core [RES-RMC-1]

STATUS	LEVEL	DURATION
Released	Core	6 hrs

This skill module brings your attention to reservoir management (RM) at an awareness competency level.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Retain flexibility in RM without giving up key principles for depletion
- Build flow units critical to RM of an asset
- Describe how the value of an asset is defined; Explain the roles of risk and uncertainty in that valuation
- Evaluate vertical equilibrium and no-crossflow and how to get the most out of each through integrated technologies from multiple disciplines

Reservoir Management Fundamentals [RES-RMF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	8 hrs 9 min

This skill module covers more advanced treatment of reservoir management principles. We look more thoroughly at special reservoir situations. We will also deal specifically with your own reservoir management asset issues in this skill module.

Designed for

Reservoir Engineers and other professionals tasked with supplying reservoir description and production data to reservoir engineers.

You will learn how to

- Manage reservoir management uncertainties throughout phases of field maturity
- Identify the geologic and reservoir parameters that make an opportunity and then the capture techniques to the particularities of that opportunity
- Conduct analysis to determine the most appropriate injectant including EOR techniques (if any) for a particular reservoir situation
- Apply the appropriate well architecture(s) or combination of well architectures to match the combined geology and reservoir drive mechanism
- Adjust and adapt the reservoir management plan for each new phase of field life

Prerequisite

- Reservoir Management Core [RES-RMC-1]

Introduction to Unconventional Reservoirs Core [RES-IUR-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 15 min

This module introduces the Unconventional Reservoir Engineering set of skill modules. In this module, the basic terminology of all the disciplines is introduced and the fundamental reservoir characterization techniques are discussed. Also covered are the basics of reservoir management and integrated teamwork and how they are essential to proper field development.

Designed for

All petro-technical professionals who have little experience with unconventional reservoirs but who need or desire to start developing some understanding of important basic concepts and methods associated with these resource types.

You will learn

- What types of unconventional reservoirs exist
- How they are different from conventional reservoirs
- How the geologic characterization is different from conventional reservoirs
- How reservoir management is different from conventional reservoirs
- How reservoir enhancement is different from conventional reservoirs
- How reservoir surveillance is different from conventional reservoirs
- How reservoir evaluation is different from conventional reservoirs
- What constitutes a “sweet spot” in unconventional reservoirs

Unconventional Reservoir Properties Core [RES-URP-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 30 min

This skill module works through the key parameters and how they are measured in understanding unconventional reservoir rock properties. Organic, Rock and Mechanical Quality Factors are defined, and various measurement techniques are described plus an understanding of the uncertainty ranges associated with those measurements.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn

- Specifics about how Organic, Rock and Mechanical Quality is quantified
- Why each factor is important in the understanding of unconventional reservoirs
- The difference between Tight Gas Sands and Shale Reservoirs
- Uncertainties in Well and Laboratory measurements of Rock Properties

Unconventional Reservoir Properties Fundamentals [RES-URP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 30 min

This skill module is designed for professional engineers and geoscientists with little experience in unconventional reservoirs who wish to quickly learn the key elements of these reservoirs and the technologies to exploit them. Focused on shale (tight) oil, tight gas, and coalbed methane, this course begins with an introduction to unconventionals then reviews geoscience elements from the previous modules and demonstrates their use in unconventional reservoir engineering. Fluid sampling for laboratory tests and fluid property correlations are presented. Drilling and completion of wells in unconventional reservoirs are considered, with a focus on horizontal wells. Stimulation fluid systems and proppants are briefly discussed. A key test for stimulation design, diagnostic fracture injection tests (DFIT’s) is presented along with classic test signatures. Attendees should leave this course with a better understanding of the basic physics of unconventional reservoirs and the fluids they hold as well as the basics of placing wells in those reservoirs to drain those fluids.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn how to

- Manage the difference between unconventional and conventional fluids
- Develop relationships between rock properties and well performance
- Calculate flow rates under conditions in which fluid models break down
- Use simulated rock volumes and discrete fracture networks

Prerequisite

- Unconventional Reservoir Properties Core [RES-URP-1]

Unconventional Reservoir Analysis Core [RES-URA-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 59 min

In this skill module, you will learn the fundamental ways that various well tests and production analyses are applied to unconventional reservoirs. Diagnostic Fracture Injection Tests (DFITs), Diagnostic Plots, Rate Transient Analysis (RTA), Decline Curve Analysis (DCA) are all historic production rate and pressure analysis tools that are being applied to unconventional reservoirs. The fundamental principles will be reviewed before the application skills are covered in the Unconventional Reservoir Analysis Fundamentals skill module. Additionally, the fundamental principles of Reserves and Resource management will be covered.

Designed for

All petro-technical professionals who have little experience with unconventional reservoirs but who need or desire to start developing some understanding of important basic concepts and methods associated with these resource types.

You will learn

- What a DFIT, RTA, DCA analysis is
- How to read a Diagnostic Plot
- Why the analysis of these techniques is different in unconventional reservoirs
- Fundamental principles of reserves and resource management

Unconventional Reservoir Analysis Fundamentals [RES-URA-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 32 min

This skill module is designed for professional engineers and geoscientists with a basic understanding of unconventional rocks and fluids and the drilling and completion of horizontal laterals who wish to quickly learn single well analysis techniques, including the key elements of these reservoirs and the technologies to exploit them. Diagnostic plots to identify flow regimes and rate transient analysis (RTA) to understand individual well performance are discussed. Field level topics include field development and reservoir surveillance. Decline curve analysis (DCA) for individual wells is presented followed by Reserves and Resources estimations in unconventionals, primarily under the Petroleum Resources Management System (PRMS) guidance. Attendees should leave this course with the tools to understand individual well behavior as well as field planning and development in the reservoirs which supply an ever increasing fraction of the world's oil and gas, unconventional reservoirs.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn how to

- Calculate volumetric estimates in unconventional reservoirs
- Apply material balance analysis with corrections for unconventional reservoirs
- Calculate properties from DFIT's
- Calculate drainage volumes from rate transient analysis
- Match historical data and forecast future production using statistical tools adjusted for unconventional reservoirs

Unconventional Reservoir Properties Fundamentals [RES-URP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 30 min

This skill module is designed for professional engineers and geoscientists with little experience in unconventional reservoirs who wish to quickly learn the key elements of these reservoirs and the technologies to exploit them. Focused on shale (tight) oil, tight gas, and coalbed methane, this course begins with an introduction to unconventionals then reviews geoscience elements from the previous modules and demonstrates their use in unconventional reservoir engineering. Fluid sampling for laboratory tests and fluid property correlations are presented. Drilling and completion of wells in unconventional reservoirs are considered, with a focus on horizontal wells. Stimulation fluid systems and proppants are briefly discussed. A key test for stimulation design, diagnostic fracture injection tests (DFIT's) is presented along with classic test signatures. Attendees should leave this course with a better understanding of the basic physics of unconventional reservoirs and the fluids they hold as well as the basics of placing wells in those reservoirs to drain those fluids.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn how to

- Manage the difference between unconventional and conventional fluids
- Develop relationships between rock properties and well performance
- Calculate flow rates under conditions in which fluid models break down
- Use simulated rock volumes and discrete fracture networks

Prerequisite

- Unconventional Reservoir Properties Core [RES-URP-1]

Unconventional Reservoir Analysis Core [RES-URA-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 59 min

In this skill module, you will learn the fundamental ways that various well tests and production analyses are applied to unconventional reservoirs. Diagnostic Fracture Injection Tests (DFITs), Diagnostic Plots, Rate Transient Analysis (RTA), Decline Curve Analysis (DCA) are all historic production rate and pressure analysis tools that are being applied to unconventional reservoirs. The fundamental principles will be reviewed before the application skills are covered in the Unconventional Reservoir Analysis Fundamentals skill module. Additionally, the fundamental principles of Reserves and Resource management will be covered.

Designed for

All petro-technical professionals who have little experience with unconventional reservoirs but who need or desire to start developing some understanding of important basic concepts and methods associated with these resource types.

You will learn

- What a DFIT, RTA, DCA analysis is
- How to read a Diagnostic Plot
- Why the analysis of these techniques is different in unconventional reservoirs
- Fundamental principles of reserves and resource management

Unconventional Reservoir Analysis Fundamentals [RES-URA-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 32 min

This skill module is designed for professional engineers and geoscientists with a basic understanding of unconventional rocks and fluids and the drilling and completion of horizontal laterals who wish to quickly learn single well analysis techniques, including the key elements of these reservoirs and the technologies to exploit them. Diagnostic plots to identify flow regimes and rate transient analysis (RTA) to understand individual well performance are discussed. Field level topics include field development and reservoir surveillance. Decline curve analysis (DCA) for individual wells is presented followed by Reserves and Resources estimations in unconventionals, primarily under the Petroleum Resources Management System (PRMS) guidance. Attendees should leave this course with the tools to understand individual well behavior as well as field planning and development in the reservoirs which supply an ever increasing fraction of the world's oil and gas, unconventional reservoirs.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn how to

- Calculate volumetric estimates in unconventional reservoirs
- Apply material balance analysis with corrections for unconventional reservoirs
- Calculate properties from DFIT's
- Calculate drainage volumes from rate transient analysis
- Match historical data and forecast future production using statistical tools adjusted for unconventional reservoirs

Waterflood Overview Core [RES-WOV-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 11 min

In this skill module, we start at the very beginning, describing what waterflooding is, how it works, and the differences between various kinds of waterfloods.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Define waterflooding
- Describe how it works
- Explain why waterflooding is applied to some reservoirs
- Explain the differences between patterns
- Describe other ways of typing waterfloods
- Describe how to measure the success of a waterflood

Waterflood Reservoir Property Effects Fundamentals [RES-WRP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	5 hrs 21 min

In this skill module, we demonstrate how rock and fluid properties affect the performance of a waterflood using analytical and numerical models. We then explain our observations by describing the physics of water displacing oil in the reservoir.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- What a DFIT, RTA, DCA analysis is
- How to read a Diagnostic Plot
- Why the analysis of these techniques is different in unconventional reservoirs
- Fundamental principles of reserves and resource management

Waterflood Reservoir Heterogeneity Effects Fundamentals [RES-WRH-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	4 hrs 30 min

In this skill module, we use models to demonstrate how heterogeneity and anisotropy complicate our understanding of how water displaces oil in the reservoir.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Explain why shale continuity is critical to predicting waterflood performance
- Describe how dipping reservoirs behave differently under waterflooding
- Describe how reservoir anisotropy controls waterflood performance
- Explain why reservoir continuity is critical to predicting waterflood performance
- Describe how natural and hydraulic fractures affect waterflood performance
- Explain how reservoir heterogeneity can be measured and compared

Waterflood Forecasting Overview Core [RES-WFO-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 7 min

This skill module is a survey of the most popular methods used to forecast waterfloods. Here we discuss strengths and weaknesses and expose assumptions on which each technique is built.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Describe multiple statistical methods of predicting waterflood performance
- Describe multiple analytical methods of predicting waterflood performance
- Describe multiple numerical methods of predicting waterflood performance
- Compare the strengths and weaknesses of these prediction methods

Waterflood Analytical Forecasting Fundamentals [RES-WAF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 19 min

This skill module is a deep dive into a selection of the most popular analytical waterflood models. We provide step-by-step instructions on how to build each one and discuss the mathematics necessary to actually make them work in the 21st century.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Predict waterflood performance using the Buckley-Leverett Method
- Predict waterflood performance using the Craig-Geffen-Morse Method
- Predict waterflood performance using the Stiles Method

Waterflood Surveillance Core [RES-WSC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 19 min

In this skill module, we assemble and describe a diversified collection of surveillance techniques that have been proven effective for managing waterfloods all over the world.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Describe multiple ways to monitor the performance of an injection well
- Describe multiple ways to monitor the performance of a producing well
- Describe multiple ways to monitor the performance of a pattern
- Describe multiple ways to measure the connectivity between injectors and producers

Producing versus Injecting Wells Fundamentals [RES-PVI-2]

STATUS	LEVEL	DURATION
Release	Fundamentals	5 hrs 23 min

In this skill module, we construct single-well models of both injectors and producers, describe their applications to waterflooding, and discuss their limitations.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Estimate the performance of an injection well using analytical methods
- Estimate the performance of an injection well using numerical methods
- Explain the advantages of modeling producing wells together with injection wells
- Compare injection above and below the oil-water contact
- Compare injection above and below bubble point
- Compare injection through vertical and horizontal wells
- Compare injection through hydraulically fractured wells
- Discuss the merits of partial perforation versus full perforation
- Explore perforation strategy differences between injection and producing wells
- Compare and contrast multiple methods of water shut-off in both injection and producing wells
- Compare and contrast multiple artificial lift methods for producing high water-cut wells
- Discuss the advantages and disadvantages of hydraulically fracturing injection and/or producing wells
- Discuss the advantages and disadvantages of gravel-packing injection and/or producing wells
- Calculate the optimal ratio of producing to injecting wells for a waterflood
- Discuss the merits of dry tree versus subsea wells for a waterflood

Waterflood Water Sources Core [RES-WWS-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 30 min

In this skill module, we compare water sources, describe how injection water interacts physically and chemically with our reservoir, wells and surface facilities, and discuss how we can change the properties of our injection water on the surface.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Identify sources of water for a waterflood
- Identify which properties of the water matter
- Identify which properties of the water source matter
- Describe how impurities can be removed from injection water
- Describe what kinds of materials are added to injection water

Waterflood Reservoir Optimization Core [RES-WRO-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 5 min

In this skill module, we survey the kinds of opportunities available to optimize a waterflood and discuss ways to efficiently implement changes.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- Explain how to search for optimization opportunities by:
  - Measuring deviations from expectations
  - Revisiting design assumptions
  - Deploying new technology intelligently
  - Moving from secondary to tertiary

Waterflood Planning Core [RES-WPC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 48 min

This skill module discusses waterflood design, compares traditional and agile approaches to design, and covers data requirements and exit strategies.

Designed for

Reservoir, production, facilities, and operations engineers who are involved with some aspects of a new or existing waterflood project; geoscientists and professionals who want to get a better feel for the entire process of planning, development, management, and recovery optimization of a waterflood project.

You will learn

- List the kind of data needed to plan a waterflood
- Explain how to measure the importance of missing data
- Describe how to pay for the collection of important data
- List the choices that need to be considered in creating a robust waterflood design
- Explain why an exit strategy is important
- Describe how to create a waterflood design that will be relevant more than two days after startup

Defining Well Objectives Core [IAM-DWO-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 5 min

This skill module provides an overview of how various well objectives contribute to the understanding of the asset. Key stakeholders and the activities that impact the well plan are discussed. Also explained in this skill module are why well objectives change over the life of the asset and the commonly used key performance metrics for the drilling discipline.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify stakeholders in an effort to define well objectives
- Explain how various well objectives contribute to understanding of the asset
- Identify activities focused on achieving well objectives and how they may impact the well plan
- Explain why well objectives change over the life of the asset
- Identify commonly employed performance metrics for the drilling discipline

Characterizing the Drilling Environment Core [WCD--CDE-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 45 min

This skill module is the basis for drilling engineering and well planning. It provides an overview of geologic formations and key characteristics which the well planner must incorporate into their design considerations. Included is an overview of petroleum geology along with descriptions of both conventional and unconventional petroleum systems, structures and traps, formation fluids, and rock properties. The relationship between pore pressure and fracture gradient is explained and their application to well design considerations. Provided is a brief description of fluid selections and properties, casing and cementing operations, wellbore stability, and well control. Leak-off tests and/or formation integrity tests are discussed and how they are conducted. An overview of formation evaluation techniques is also addressed, including mudlogging, wireline LWD logging, coring, and testing with the data collected during each activity. An overview of types of drilling rigs and their most suitable application coupled with operational risks is also provided.

Designed for

Operator and service company technical staff including drilling engineers and operations supervisory personnel. A practical basis for non-technical staff involved in supporting drilling operations.

You will learn

- The basis of well planning and how geology and geologic characteristics affect the well plan
- How pore pressure and fracture pressure are critical in well planning and active drilling operations
- Where to source the expertise and information required to form the basis of the well plan
- How to utilize rock types and properties, formation fluid types and properties, and other geoscience information appropriately in well design and operational decisions including: fluid selection, casing points, cementing operations, well control procedures, and risk assessment
- The significance of the leak-off test and formation integrity test data and how to support operational decisions
- What formation evaluation methods are available and how to actively utilize them to support well planning and real time decision-making
- What type of drilling rig is best suited for a particular environment and critical concerns when operating in that particular environment

Directional Drilling and Trajectory Design Core [IAM-DDC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 33 min

Directional drilling may be considered the "intentional, controlled deflection of a wellbore to intersect pre-determined targets." In the early days when wooden derricks were erected so close that they touched each other, wellbores that were believed to be vertical occasionally intersected nearby wellbores, proving that the wells were in fact deviating from vertical. This was not directional drilling because this behavior was neither intentional nor controlled. Modern directional drilling is based on an understanding of the reservoir and how the wellbore should be constructed for its proper placement in the reservoir for optimum productivity.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Describe the objectives of directional drilling
- Recognize trajectory design options and selection criteria for given surface and downhole requirements
- Clarify trajectory measurement and wellbore position calculation techniques and limitations

Drilling Fluids and Solids Control Core [IAM-DFS-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 35 min

Drilling fluids are the “life-blood” of drilling operations and comprise a wide-range of functions including suspension of formation cuttings, maintaining wellbore integrity, downhole pressure control and others. The proper selection of a drilling fluid can allow optimum performance in each of these areas as well as meeting environmental guidelines and performance objectives. The successful removal of solids from the fluid allows cost-effective maintenance of fluid properties and overall reduced well costs. This skill module addresses these topics at an awareness level.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify functions of drilling fluids
- Explain fluid types and their selection criteria
- Identify fluid properties, how they are measured, and additives used to control them
- Explain benefits of solids control, solids control equipment function, and system configuration

Oilfield Casing Core [WCD--OCC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 33 min

Casing is pipe that goes into the wellbore and stays in the well because the outside of the casing is cemented to the earth which provides wellbore integrity. In other words, casing’s primary purpose is to keep the wellbore from caving in or fracturing, to keep unwanted fluids from entering the wellbore, and to keep the desired fluids (hydrocarbons) from leaving the borehole at undesirable places. In this module, you will study five topics:

- The Drilling Process: This topic introduces the process of drilling an oil well, showing how casing, mud, and cement are used
- API/ISO Standards: This topic overviews the naming conventions for casing. It explains how to identify casing by its properties
- The Casing Manufacturing Processes: This topic introduces the two major methods of making casing, Seamless and Electric Resistance Weld (ERW). It explains the processes by which both types of casing are made, from generating the steel to the formation of the finished casing products
- Casing Properties and Dimensions: This topic provides an in-depth explanation of each casing property. It describes, in detail, each dimension listed in the API/ISO naming convention
- Casing Strings: This topic overviews the four casing strings—conductor, surface, intermediate, and production—and how these casing strings work together in an oil field well

Designed for

Individuals interested in the basic use of casing in oil fields and members of an extended multidiscipline team

You will learn how to

- Describe the purpose of casing in an oilfield well
- State how joints of casing are connected together
- Recognize the steps in the process for drilling and cementing casing in an oil/gas well
- Demonstrate knowledge of the API/ISO casing naming convention
- Discuss the advantages and disadvantages to casing produced with seamless and ERW properties
- Identify casing descriptions and dimensions and, when appropriate, describe the correlation between them
- Identify where the four different casing applications are in a wellbore schematic

Bits and Hydraulics Core [IAM-BHC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 25 min

This skill module addresses roller cone and fixed cutter bit design features and their associated hydraulics programs at an awareness competency level.

Designed for

Technical staff, business professionals, technicians, analysts, and other non-technical staff who are involved with but have limited experience with drilling operations.

You will learn how to

- Identify design features and selection criteria for roller cone bit types
- Explain failure modes for roller cone bits and how this information can be used to improve performance
- Identify design features and selection criteria for fixed cutter bit types
- Explain failure modes for fixed cutter bits and how this information can be used to improve performance
- Explain tool system options which allow wellbore enlargement to a diameter greater than the internal drift diameter of a previously installed casing string
- Discuss situations where this may be required
- Explain rotary coring bit options
- Explain the relationship between cost per foot of a bit run and the cost of a bit, its rate of penetration, footage drilled, and the cost of the drilling operation
- Determine optimum time to pull a used bit based upon its cost per foot trend
- Balance competing objectives for the drilling hydraulics system
- Maintain ECD below fracture pressure of open hole
- Select nozzle sizes for adequate bit hydraulics
- Maintain operating pressure and total pump power demands within rig capabilities

Well Performance Management Core [WCD--WPM-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 25 min

Performance improvement illustrates several process, organization, and leadership approaches and tools utilized to make drilling more effective and efficient. Activities are identified in both the planning phase and the operational phase. Opportunities are targeted that focus on making individual tasks safer, more efficient, and more consistent and, where appropriate, on moving tasks off the critical path of the rig to shorten well delivery time. Critical leadership and team skills are reviewed to reinforce desired behaviors and establish working culture. Finally, non-productive time mechanisms, including stuck pipe prevention, are addressed in detail with case studies.

Designed for

Operator and service company technical staff including drilling engineers and operations supervisory personnel.

You will learn

- Explain the concepts and benefits of a performance improvement process for drilling
- Explain what an AFE is, and its components
- Explain the purpose of After-action reviews and why they are relevant to future operations
- Recognize the importance of governmental approvals and permits as required by the drilling business
- Recognize the importance of safety management plans in the drilling environment
- Explain what comprises an "oil spill" and the importance of having a spill remediation plan
- Recognize the critical role of waste management at the well site
- Recognize why safety is everyone's responsibility at the wellsite
- Describe what constitutes Job Safety Analysis

Well Construction Supply Chain Management Core [WCD--WCS-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 35 min

This is an introductory module that reviews the basic concepts of personnel relationships at the well site, supplier management, technical and HSE inspections at the well site, third party contracting, and logistics pertaining to the well construction operation.

Designed for

This module is designed for anyone who desires a basic overview of these topics as they pertain to the supply chain processes at the well site.

You will learn how to

- Explain the basic objectives and working relationships between operators, drilling contractors, and service companies at the well site
- Describe the purposes of rig and service company inspection programs as they pertain to equipment, personnel, and HSE adherence at the well site
- Describe the basic process of rig contracting and acquisition
- Describe “third party” rig service contracting
- Identify goals to supply drilling rig operations with the necessary tools, equipment, and services as required

Stuck Pipe Prevention Core [WCD--SPP-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 10 min

This module specifically addresses the basis for understanding and preventing stuck pipe situations during drilling operations. It provides a general overview of geological formations and how these formations can become unstable during a drilling operation. Likewise, drilling fluids are discussed and how they can impact the stability of the wellbore. This module also covers the mechanisms for pipe sticking, how to diagnose stuck pipe situations, and how to implement recovery efforts. Information is also given on how long to devote to fishing efforts. Lastly, this module covers drill string operating limits and gives calculations on how much pull can be on the drill string.

Designed for

Operator, drilling contractor, and service company technical and non-technical staff, including drilling engineers, drilling technicians, drilling supervisors, tool pushers, and drillers.

You will learn

- The contributing factors to wellbore stability and how pore pressure and fracture pressure change during the drilling operation
- The primary requirements of the drilling fluid and what the desired performance fluid properties should be
- All the factors and forces that affect hole cleaning efforts within vertical and horizontal wells
- How to diagnose stuck pipe situations by determining the specific sticking mechanism and how to implement recovery efforts
- About the different industry fishing tools available and how they function
- How to make good decisions about how much time a drilling operation should devote to a fishing operation
  The limits of a drill string and how much can be pulled

Production Principles Core [PCE-PPC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 57 min

This skill module introduces four characteristics of optimum oil and gas depletion production principles, namely:

1. Effects of Geological and Reservoir Properties
2. Inflow and Outflow Performance
3. Tubing Strings, Outflow, and Lift Mechanics
4. Field Development Planning

Each is examined to illustrate the importance of up-front data acquisition to perform studies to understand target design objectives for both conventional oil and gas reservoirs and unconventional shale oil and shale gas reservoirs and unconventional coal bed methane reservoirs.

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 artificial lift design and operations.

You will learn

- Effects of depositional environment and the rock cycle in the formation of hydrocarbon accumulations
- Reservoir engineering principles that guide optimum conventional and unconventional reservoir development
- The important characteristics of oilfield Inflow and Outflow and their related mathematical flow equations and applied principles required for system modeling
- Why a well flows on natural flow and the eventual requirement for artificial lift to maximize overall recovery as reservoir depletion occurs and reservoir energy diminishes
- Special considerations for tubing regarding erosional velocity and critical flow condition
- Key field development parameters that are common to all well designed hydrocarbon exploitation systems

Well Performance and Nodal Analysis Fundamentals [PCE-WPN-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs

This skill module explains the key principles in analyzing well performance parameters of any production (or injection) well using the principles and practices of NODAL™ analysis, also referenced as system analysis. Inflow and outflow equations are developed, multiphase hydraulics are reviewed, the building blocks of NODAL™ analysis are expanded, and several exercises are worked.

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 artificial lift design and operations.

You will learn how to

- Collect and validate required data to evaluate well performance using computer modeling, performance history matching and predict potential problems
- Calculate productivity index and estimate basic reservoir parameters by interpreting a simple pressure buildup analysis in conventional and unconventional resources plays
- Identify flow restrictions from basic inflow performance analysis, recommend actions to improve well productivity, and describe how to use choke equation calculations and its limitations

* "NODAL Analysis" is a trademark of Flopetrol Johnston, a division of Schlumberger Technology Corporation, and is protected by U.S. Patent #4,442.710.

Prerequisite

- Production Principles Core [PCE-PPC-1]

Onshore Conventional Well Completions Core [PCE-OCW-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 5 min

This skill module describes the major tools, techniques, and processes for completing wells in conventional situations.

Designed for

Production Operations Staff, Reservoir Engineers, Facilities Staff Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers

You will learn

For conventional plays in onshore situations:

- The purpose and basic operational aspects of wellhead, flow control equipment, and the major components used in a basic well completion in conventional plays
- The impact that drilling practices may have on reservoir productivity
- Specify the production target of a well and describe the type of completion or workover design components required to achieve the target
- Describe the basic properties and function of tubing
- Describe which fluid systems are the most important for implementing successful completions and workovers in wells in conventional plays
- Describe the most common equipment components used in conventional wells and what they are used for
- Describe the most relevant steps for implementing completion procedures in wells in conventional resources plays and the proper interaction with all parties involved required
- Describe the most relevant aspects of HSE in completion operations
- Describe how a well flows, the impact of well control on fluid flow, and the most common control and monitoring devices
- Describe the basic requirements to abandon conventional wells Specify the production target of a horizontal well, and describe how this differs from a typical vertical well

Prerequisite

- Well Performance and Nodal Analysis Fundamentals [PCE-WPN-2]

Onshore Unconventional Well Completions Core [PCE-OUW-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 44 min

The term “Unconventional Resources” cuts a wide swath and encompasses many different and unrelated hydrocarbon resources. They have constituted a small but relevant segment of the oil and gas industry for many decades. However, since only about 1998, with the development of shale drilling and completion methodologies, have Unconventionals become front page news. Although most relevant in North America, shale plays are being probed and tested in many regions of the world.

This skill module addresses both the completion process and the physical completion design of unconventional shale wells at the core level. The strongest focus of the skill module is on horizontal shale wells but also includes a section on Coalbed Methane and one on Heavy Oil as well.

Designed for

Production Operations Staff, Reservoir Engineers, Facilities Staff Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers.

You will learn how to

- Describe the purpose and basic operational aspects of wellhead and flow control equipment in wells in unconventional plays
- Describe the purpose of each of the major components used in a basic well completion in unconventional resources plays, and the impact that drilling practices have on reservoir productivity
- Describe the function and limitations of each surface and subsurface component of a basic onshore completion in unconventional resources plays
- Describe the basic properties of completion components materials and their limitations in unconventional resources plays
- Describe which fluid systems are the most important for implementing successful completions and workovers in wells in unconventional resources plays
- Describe the most relevant steps for implementing completion procedures in wells in unconventional resources plays, and the proper interaction with all parties involved required
- Describe the most common techniques used to drill, complete, stimulate, and produce typical wells in coalbed methane reservoirs

Prerequisite

- Onshore Conventional Well Completions Core [PCE-OCW-1]

Primary and Remedial Cementing Core [PCE-PRC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 55 min

This skill module presents an overview of the planning and execution required to achieve the quality primary cementing of well casing strings to successfully isolate a wellbore’s geological column, including the well’s productive zone(s). Equipment and cement displacement practices are illustrated and described as well as methods to assess the resultant cement sheath surrounding casing following a cementing job. Preliminary lab work to formulate primary cement blends is described. Various methods are presented in the remedial repair of poorly cemented zones which can lead to life of the well production problems. Several different cement squeeze techniques are explained, and recommended practices are described.

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

- The manufacturing processes to blend composite materials that make up oilfield cement
- The various uses of additives to modify cement properties
- The cementing tools at the surface and downhole and the related cement displacement process to achieve a quality primary cement job to isolate a casing string
- The casing cement evaluation tools and methods to assess cement job quality
- The various practices that comprise options to attempt repair of primary cementing jobs that are referred to as cement squeeze operations
- How to calculate typical casing string cement volume requirements
- How to evaluate a cement bond log and make recommendations
- How to conduct plug and abandonment operations, what they are, basic equipment used and expected results to securely isolate the wellbore from the environment and human interaction for the future

Prerequisite

- Onshore Unconventional Well Completions Core [PCE-OUW-1]

Perforating Core [PCE-PEC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 27 min

This skill module illustrates the tools and processes for establishing communication between a well and the productive formation(s) accessed by the well. The evolution of shaped charges is presented and the means for delivering perforating charges into a well using various gun configurations is illustrated. The importance of understanding charge performance to select the appropriate charge for a particular set of well conditions is discussed.

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 artificial lift design and operations.

You will learn

- The various shaped charges, their design, performance, shot phasing and shot density options, and their advantages and limitations
- The three primary perforating gun conveyance systems and the various gun types available and their individual features Concepts like perforation tunnel damage, gun standoff, underbalance, gun correlation on depth, and other engineering input requirements for each perforation job design

Prerequisite

- Onshore Unconventional Well Completions Core [PCE-OUW-1]

Rod, PCP, Jet Pumps, and Plunger Lift Core [PCE-RPJ-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 17 min

This skill module will specifically describe the engineering design and operational requirements of Rod Pump, Progressing Cavity Pump (PCP), Jet Pump, and Plunger Lift well completion types.

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

- How to evaluate reservoir and well conditions to choose the appropriate artificial lift system for each set of conditions
- How rod pump, PCP pump, jet pump, and plunger lift artificial lift systems work
- How to design and optimize rod pump, PCP pump, jet pump, and plunger lift completions
- Why surveillance and monitoring of artificial lift systems is essential
- Various API and related design standards and practices that represent key, proven artificial lift system performance fundamentals

Prerequisite

- Primary and Remediate Cementing Core [PCE-PRC-1]
- Perforating Core [PCE-PEC-1]

It is recommended that the learner have previous knowledge of basic Inflow and Outflow concepts and related Nodal™ Analysis principles and applications. The Production Principles Core skill module covers Inflow and Outflow at the awareness competency level.

* "NODAL Analysis" is a trademark of Flopetrol Johnston, a division of Schlumberger Technology Corporation, and is protected by U.S. Patent #4,442.710.

Reciprocating Rod Pumps Fundamentals [PCE-RRP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	8 hrs 21 min

The skill module focuses upon understanding the three main components of a rod pump well completion, namely, the surface unit, the rod string, and the downhole pump. Each pump component is examined and investigated to define specific rod pump completion loading and design parameters. Related overall rod pump design considerations necessary for optimizing pump design and operation are presented. Different types of surface unit configuration geometries are presented with the positives and negative attributes of each discussed. The API rod string design method is reviewed, and two rod string designs are then conducted as exercises. Steel and fiberglass rods as well as continuous rod (Weatherford Corod™) designs are illustrated with positive and negative features highlighted. Surface dynamometer data gathering for rod pump optimization is presented. Three complete pump design exercises are worked.

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 artificial lift design and operations.

You will learn how to

- Apply the working principles and operating characteristics of oilfield reciprocating rod pump artificial lift technology
- Employ the steps necessary to design, maintain, and service
    - rod pump surface unit equipment
    - rod pump rod strings
    - rod pump downhole pumps
- Develop engineering and operating skills to successfully design, properly set up, maintain, and provide overall service for implementing and applying reciprocating rod pump artificial lift technology
- Illustrate using pictures, animations, sketches, design software, and other media and tools the key mechanisms of rod pump systems
- Design a rod pump rod string using the Modified Goodman method
- Highlight the considerations and adjustments being reviewed by API regarding standards for proper consideration of rod fatigue and related corrosion effects upon rod string design
- Work several rod pump design exercises to assess maximum and minimum pump load, minimum and maximum rod stress, motor selection, strokes per minute, stroke length, and related overall rod pump design parameter selection
- Describe how a rod pump surface dynamometer gathers rod pump loading data over each pump cycle, calculate maximum and minimum rod stress loading, predict downhole pump performance, select rod string taper sizing, select motor horsepower required, and evaluate overall pump performance while identifying rod pump problems, all using a rod pump dynamometer, known as The Analytic and Predictive Tool for reciprocating rod pumps
- Outline the primary causes of rod failure and how the use of rod guides and other auxiliary equipment can mitigate failures, the effect of gear box overload and how to prevent it, the proper selection of rod metallurgy for corrosion conditions, and the need for disciplined inspection of well tubing and rods to minimize failures
- Demonstrate how the use of modern instrumentation “smart well” systems to control pump operation, gather data, and manage pump functions results in optimum pump performance and minimized costs

Prerequisite

- Rod, PCP, Jet Pumps, and Plunger Lift Core [PCE-RPJ-1]

Gas Lift and ESP Pump Core [PCE-GLE-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 43 min

This skill module will examine the reasons why and when artificial lift systems are required and the methodology to select the most appropriate artificial lift technology to meet reservoir and completion requirements. Next, the skill module will specifically describe the engineering design of and operational requirements of Gas Lift and Electrical Submersible Pump well completion types.

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 artificial lift design and operations.

You will learn

- Why artificial lift is required to maximize ultimate recovery
- How to evaluate reservoir and well conditions to choose the appropriate artificial lift system for each set of conditions
- How each artificial lift system works
- How to design and optimize gas lift and ESP completions
- Why surveillance and monitoring of artificial lift systems is essential
- Various API and related design standards and practices that represent key, proven artificial lift performance fundamentals

Prerequisite

- Perforating Core [PCE-PEC-1]

Gas Lift Fundamentals [PCE-GLF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 29 min

This skill module describes when best to use gas lift, run inflow performance analysis sensitivity cases, and select optimum tubing size to achieve production rate targets in wells in conventional and unconventional resources plays. It describes the gas lift theory, equipment and covers the best practices of gas lift design, surveillance, and optimization.

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 artificial lift design and operations.

You will learn how to

- Explain situations when gas lift is appropriate
- Calculate the production rate and the flowing bottom-hole pressure from inflow performance analysis in a well completed with a gas lift system
- Calculate the gas lift rate and pressure required to produce the well at a stable flow for various tubing sizes
- Select the appropriate tubing size for a well to be completed with a gas lift system
- Calculate the production rate and flowing bottom-hole pressure using widely accepted techniques applicable to unconventional resources wells completed with a gas lift system
- Design a gas lift installation with the required number of unloading mandrels, charge pressure, and orifice size lift valves at the appropriate spacing based on available gas lift pressure and required lift rate for conventional and unconventional resources
- Operate, troubleshoot and optimize gas lifted wells and network systems

Prerequisite

- Gas Lift and ESP Pump Core [PCE-GLE-1]

Electrical Submersible Pumps Fundamentals [PCE-ESP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs

This skill module explains how to conduct inflow performance analysis and select the appropriate electrical submersible pump (ESP) configuration to achieve production rate targets in wells in conventional and unconventional resources plays and document equipment failure data when required.

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 artificial lift design and operations.

You will learn how to

- Calculate the production rate and the pump intake pressure from inflow performance analysis
- Calculate the free gas and fluid viscosity at pump intake conditions
- Determine the pump capacity and motor horsepower required to deliver the desired flow or rate limited by the ESP equipment
- Determine the power cable type and gauge based on formation parameters
- Ensure ESP equipment failure data is properly documented
- Review failure trends
- For an ESP design, select the appropriate protector for a given application
- Calculate the production rate and pump intake pressure using widely accepted techniques applicable to unconventional resource wells
- Determine the pump capacity and motor horsepower required to deliver the desired production rate in unconventional resource wells

Prerequisite

- Gas Lift and ESP Pump Core [PCE-GLE-1]

Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 3 min

This skill module addresses less than expected production results following initial completion or any well intervention operation and the many possible causes involved. Characteristics of formation damage are explained. Matrix acidizing (acidizing operations conducted at treatment pressures less than fracture pressure) is developed for both limestone and sandstone formations to improve production. Important principles of candidate selection and job planning, and execution are addressed.

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

- The basic causes of oilfield formation damage and how they are recognized
- The concept of “True Formation Damage” and the principles of formation remediation once it has been correctly identified as being the cause of lost production
- How “pseudo” damage and differs from True Formation Damage
- The principles of limestone matrix acidizing and the chemistry and reactions involved
- The principles of sandstone matrix acidizing and the chemistry and reactions involved
- Formation damage identification and the positive results achieved by successfully conducting matrix acidizing jobs

Prerequisite

- Perforating Core [PCE-PEC-1]

Formation Damage and Matrix Acidizing Fundamentals [PCE-FDF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 40 min

This skill module addresses the complex oilfield phenomena that studies and attempts to resolve production loss or less than expected production rate following initial completion or any well workover or intervention activity. Formation damage is a term often used to describe the cause of production loss; its use is commonly misunderstood or misused as many factors and circumstances may be the cause of reduced rate. The set of circumstances referred to as “True” Formation Damage is described in detail; production loss caused by these circumstances may often be remediated as long as causes are properly defined, and appropriate remedial steps are taken. Other causes of production shortfall, also grouped into the formation damage term to describe lost production, are identified in the module along with recommended remedial steps to address them. Use of the reservoir engineering term “skin” is explained and quantified in the module. Production loss remediation due to “True Formation Damage” using principles of matrix acidizing and surfactant chemistry are presented in detail. The complex reactions that take place using a Hydrofluoric acid / Hydrochloric acid on sandstones (referred to as “Mud Acid”) and the Hydrochloric acid reaction on limestones to remove production loss factors are explained. Fracture acidizing of limestones is explained, and examples illustrated. Matrix acidizing operational considerations of corrosion inhibition, acid additive selection, iron control, acid diversion, and related important topics are addressed and explained. Several practical exercises are worked to illustrate key module principles.

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 artificial lift design and operations.

You will learn how to

- Illustrate the impact of formation damage upon production
- Explain the wide variety of reasons, sources, depositional environments, and routine operations’ activities that result in production limitations
- Assess formation damage “skin” values
- Calculate production rates with various levels of formation damage as well as no formation damage
- Describe how TFD is recognized and how PD is recognized and present the characteristics and elements of each
- Illustrate clay stabilization through the use of positively charged cation exchange to stabilize negatively charged clays to limit clay migration, hydration, and other damaging mechanisms

Prerequisite

- Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

Flow Assurance and Production Chemistry Core [PCE-FAP-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 50 min

The term “Flow Assurance” and the tools of “Production Chemistry” comprise this skill module’s content to examine the identification, remediation, and preventive aspects of common wax, asphaltene, scale, and corrosion problems common to most all hydrocarbon production scenarios in one manner or another. Each of these problems requires the application of varied principles and practices of production chemistry in various ways to directly address the control and removal of these complications which negatively impact production. Pictures, illustrations, and examples of typical field problems and challenges faced are developed with the singular goal of presenting proven, least cost, safe remedies to return production to its initial, expected rate.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers; field supervisors; field technicians, service company engineers, and especially engineers starting a work assignment in production engineering and operations or other engineers wanting a foundation in the principles of managing the identification, treatment, prevention, and overall control of oilfield waxes, asphaltenes, inorganic scales, and corrosion.

You will learn

- Typical oilfield “flow assurance” issues and problems due to waxes, asphaltenes, inorganic scales, and corrosion
- How to interpret revealing signs of corrosion and erosion failure, scale formation, and related downhole deposits and how to prevent or minimize their production loss effects
- How formations become damaged due to related flow assurance and production chemistry issues
- The importance of collecting data to categorize options to choose an optimum well prevention and treatment plans
- How to recognize, prevent, remove, and manage organic paraffin and asphaltene field deposits
- How to recognize, prevent, remove, and manage typical common soluble and insoluble scales in oil and gas operations
- The importance of using oilfield production chemistry to resolve production problems
- The conditions required for the formation of gas hydrates
- How ice crystals and methane in pipelines can lead to severe plugging of lines if not prevented from occurring or regularly removed by pigging operations
- The methods employed to treat gas hydrates in pipelines

Prerequisite

- Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

Sand Control Core [PCE-SCC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 28 min

This skill module illustrates various causes of sand production and its related effect upon producing systems. Alternatives that range from simply tolerating minimal sand production volumes to complex downhole and surface equipment and practices to mitigate the negative effects of sand production are presented. Basic gravel pack design is discussed, and a design problem is presented. Expandable sand screens are illustrated.

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 artificial lift design and operations.

You will learn how to

- Identify the need for sand control
- Recognize the causes of sand movement
- Define what consolidated sand is, and what it is not
- Identify both non-mechanical and mechanical methods of sand control
- Recognize that rate restriction is a valid practice to manage sand production
- Recognize that minor sand volume produced may be tolerated
- Identify various screen types for sand control
- Outline aspects of pre-packed screens for sand control
- Describe the principles of sand control screen and gravel completions
- Identify the three steps comprising a gravel pack completion design
- Describe various fluid options for pumping gravel slurry into a gravel pack completion
- Outline the function of a gravel pack “crossover tool”
- Outline the function of a gravel pack “shunt tube”
- Describe the function of a frac pack completion
- Outline the frac pack completion well performance results
- Outline the function of an expandable sand screen completion
- Identify the components of an expandable screen and possible benefits resulting from the use of expandables

Prerequisite

- Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

Sand Control Fundamentals [PCE-SCF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	7 hrs 18 min

This skill module begins by discussing both the causes of sand production and the effects that sand production can have on our oil and gas wells. The subsequent sections describe the methods and the equipment used to control sand production. All the major types of sand control completions are discussed, along with their strengths, weaknesses and the conditions under which they can be applied. Many new technologies have been introduced in the last several years, such as FracPacking and Expandable Screens. This module will discuss several that have been successfully applied. We will also discuss many of the more common problems encountered and how to avoid these problems.

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 artificial lift design and operations.

You will learn how to

- Outline the completion options for sand control
- Recognize completions with no direct downhole mechanical control devices
- Identify equipment installed downhole to control the sand
- Describe chemical methods to control sand production
- Describe many different types of screen designs used in sand control completions, with or without a gravel pack
- Describe the use of gravel packs in both openhole and cased hole completions
- Determine formation sand size distribution and why it is required to perform a successful gravel pack
- Describe the completion equipment required to place a tight gravel pack in a well
- Recognize the importance of using clean fluids to place the gravel
- Recognize the benefits of using horizontal wells to reduce sand production and improve well productivity
- Describe how to gravel pack horizontal wells using brines or gels
- Describe how alternate path technology can be used to ensure successful gravel packs when using gel carrier fluids
- Identify the common mistakes that reduce productivity in gravel packed wells
- Describe how the use of fluid loss control materials can lead to positive skins for wells
- Apply Darcy's law calculations to determine the effects of a positive skin
- Evaluate the use of expandable screens as a sandface completion method
- Describe the limitations of expandable screens
- Outline the benefits of fracpacking wells as a sand control completion method
- Describe how fracpacks improve well productivity, compared to most other completion methods
- Outline how to apply a fracpack completion
- Outline the benefits of screenless fracpacks
- Describe fracpacking horizontal wells

Prerequisite

- Sand Control Core [PCE-SCC-1]

Production Problem Diagnosis Core [PCE-PPD-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs

The early detection of "Problems" in producing and injection wells is one of a Production Engineer's primary responsibilities. The earlier that one recognizes a problem exists, the less severe the problem, the sooner the problem can be corrected, and the sooner the production rate will be restored. This skill module focuses on four primary aspects of "Problem Wells": 1) Causes, 2) Effects, 3) Detection, and 4) Prevention.

Designed for

Production Operations Staff, Reservoir Engineers, Facilities Staff, Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers.

You will learn how to

- Identify the characteristics of "Problem Wells"
- Recognize that the term "Problem Well" can be applied to both producing and injection wells
- Recognize the many different causes of "Problem Wells"
- Recognize how these different causes manifest themselves in either productivity reductions or operational problems associated with our wells
- Recognize the various diagnostic methods available to determine that a problem(s) exists
- Understand the various Production Logging Tools (PLT) available to determine the causes of our well problems
- Determine the "Problem Wells" based on a table
- Properly diagnose a "Problem Well" based on information given in a table
- Understand the importance of complying with well component requirements to ensure the integrity of a well though the life of the well
- Understand the process of Root Cause Failure Analysis as it applies to ESP failures
- Recognize many of the methods available to us to prevent wells from becoming "Problem Wells"

Prerequisite

Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

Production Logging Core [PCE-PLC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 12 min

Experience indicates that surface fluid measurements are not adequate enough to describe the efficiency of the downhole production system. In new completions, production logging services are used both to ensure optimum ultimate recovery and to investigate production problems brought to light by surface performance. In older wells, the logs aid in identifying mechanical issues and thus assist in planning remedial work for declining producers. If properly planned and executed, production logging is an intrusive measurement method which will help to diagnose the health of producer or injector wells.

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, as an introduction to Production Logging within the frame of a production engineering curriculum.

You will learn

- The principles of cased-hole evaluation tools
- The typical applications and justification for running cased-hole evaluation tools
- The conveyance methods for running cased-hole evaluation tools in the field
- The principles of wireline-run cased hole evaluation tools
- The principles and operation of
  - the logging tools associated with flowmeter tools
  - basic temperature logs
  - basic radioactive tracer logs
  - basic spinner flowmeter logs
  - the gradiomanometer log
- The performance of cased hole logs in single phase flow
- The advantages of running multiple tools within a Production Combination Tool
- Discuss the added value of running a downhole video log in addition to production logs

Prerequisite

- Production Problem Diagnosis Core [PCE-PPD-1]

It is recommended that the learner have previous knowledge of basic Inflow and outflow concepts, fluid behavior and completion downhole equipment.

Production Logging Fundamentals [PCE-PLF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 15 min

From the awareness wells through intelligent completions, the goal of Production Logging is to achieve an accurate interpretation of downhole tool measurements.

This skill module focuses on the description of physical behavior of single and two-phase flow in wells and introduces the conventional interpretation methods and their limitations.

The latest developments of production logging tools for application in multiphase flow and highly deviated/horizontal wells are covered in the last section. These tools provide a more detailed and reliable picture of fluid distributions and flow rates and overcome the limitations of conventional tools, which still remain applicable.

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

- Calibration principles of flowmeter tools
- The principles involved in interpreting production logging tool data
- The performance of cased hole logs in multi-phase flow
- The application of cased hole logs in deviated wells
- The application of recent advances in cased hole logs in deviated and horizontal wells
- Actual field applications of production logs in three-phase flow
- How production logs can assist water shut-off decisions

Prerequisite

- Production Logging Core [PCE-PLC-1]

It is recommended that the learner have previous knowledge of basic Inflow and outflow concepts, fluid behavior and completion downhole equipment.

Design Process for Completion and Workovers Core [PCE-DEC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 25 min

This skill module focuses upon three main work products of a typical completion or workover design – the proposed well sketch, the proposed procedure, and then the underlying basis of design. In addition, field/rig morning reports are introduced and reviewed in view of the original design plans.

Designed for

Engineers within the first two years of a completions and/or workover role, Production operations staff, Service company engineers and managers, Drilling engineers, Reservoir Engineers, Field supervisors and managers, other asset team members who routinely work with completion or workover staff.

You will learn how to

- Explain the work product of a completions engineer
- Describe an initial completion procedure and sketch
- Translate chronological steps from a procedure to a well sketch
- Recognize and describe morning reports
- Recognize the engineering that is required for developing a procedure
- Explain and provide an example of Basis of Design (BOD)
- Compare and contrast design and BOD
- Illustrate and explain the link between management systems and the engineering design process
- Identify the objectives of a completion
- Identify and describe each aspect that is to be considered to achieve the two objectives
- Compare the different drive mechanisms

Completion Design Fundamentals [PCE-DEF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	10 hrs 18 min

This skill module will take you through multiple facets of completion design Fundamentals. The topics that are covered in this module include an extensive look at conduits, circulating and killing wells, inflow and outflow along with well barriers and well servicing fluids, and a few more.

Designed for

Engineers within the first two years of a completions and/or workover role, Production operations staff, Service company engineers and managers, Drilling engineers, Reservoir Engineers, Field supervisors and managers, other asset team members who routinely work with completion or workover staff.

You will learn how to

- Recognize the various design concepts which will be covered throughout the module
- Identify the most common sandface completion options
- Explain the advantages and disadvantages of each option
- Describe the different conduit options
- Explain the benefits or disadvantages of each option
- Differentiate between “killing” and “offloading” the well
- Explain the various options for displacement or circulating in a completion
- Describe the difference between bullheading and circulating
- Describe where to locate the primary circulating device
- Differentiate between the various circulating path options
- Explain the relationship between inflow and outflow
- Explain how this relationship impacts completion design
- Describe the most common method of determining inflow – Darcy’s law
- Define a barrier
- Explain why barriers are critical to well operations
- State the normal industry practice for the number of barriers required during an operation
- Determine a hydrostatic barrier density requirement
- Describe the functions of well intervention fluids
- List the main types of completion fluids
- Describe common additives
- Differentiate between completion fluids, packer fluids, kill fluids, perforating fluids, and others
- Explain several of the most important interface points between drilling and completions
- Describe primary cementing and the impact on the completion
- Production casing size and the impact on the completion
- Drill-in fluids, and their impact on the completion
- Identify and explain trajectories
- Explain the typical spacing of many oilfield components used in a completion
- Identify common symbols used for oilfield components in a well sketch
- Critique a well sketch
- Describe the potential failure mechanisms for metal components
- Explain the basic principles of corrosion
- Use a sample metal selection chart to select metals for well conditions
- Describe selection criteria for elastomers

Well Completions Fundamentals [PCE-WCF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 22 min

This skill module covers five sections, including well completion equipment, packers, landing nipple and lock mandrel systems, safety valves, and circulation devices.

Designed for

Engineers within the first two years of a completions and/or workover role, Production operations staff, Service company engineers and managers, Drilling engineers, Reservoir Engineers, Field supervisors and managers, other asset team members who routinely work with completion or workover staff.

You will learn how to

- Identify the functionality linked to downhole equipment
- Recognize the full suite of equipment to be further covered in this module
- Describe the difference between wellheads and Christmas trees
- Describe the functions of a wellhead
- Analyze a video of a wellhead, identifying the various annuli and various seals
- Describe the function of a Christmas tree
- Analyze a video of a Christmas tree video, and identify the various valves and their functions
- Identify the appropriate API standards to reference
- Identify the various characteristics of a tubing string, including weight/internal diameter, outside diameter, metallurgy, and associated properties
- Describe the main differences between API connections and premium connections
- Explain the results from a torque/turn chart
- Describe tubing and connection selection criteria
- Identify the primary function of a packer
- Identify the significant mechanical components of packers
- Describe one method of categorizing packers
- Describe several packer setting methods
- Explain the main options for connecting the tubing to the packer
- Describe the physical basis for tubing length changes
- Calculate a simple tubing length change
- Describe the components of a landing nipple and lock mandrel system and explain why this system is used
- Identify the primary function of a safety valve
- Differentiate between a surface controlled and a subsurface controlled valve
- Describe the conditions where a safety valve should be placed in the well
- Describe the operation of a typical sliding side door
- Explain reasons for including a circulating device
- Differentiate between circulating points for liquid and those for gas
- Describe common completion accessories, including wireline re-entry guides, blast joints, and flow couplings
- Demonstrate uptake of the skill modules that have been covered up to this point
- Identify areas requiring review
- Design a completion, incorporating equipment, reservoir data, fluid data, etc.

Well Intervention Core [PCE-WIC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 45 min

This skill module describes the operating capabilities of the main types of intervention techniques, including bullheading, slickline, electric line, coiled tubing, hydraulic workover units, and workover rigs. The general relative costs of each type of method will be discussed as well as the main operational abilities of circulating, rotating, pushing/pulling, and entering a "live" well.

Designed for

Engineers within the first two years of a completions and/or workover role, Production operations staff, Service company engineers and managers, Drilling engineers, Reservoir Engineers, Field supervisors and managers, other asset team members who routinely work with completion or workover staff.

You will learn

- Describe the main components of a/an:
  - Slickline unit
  - Braided wireline unit
  - Electric line unit
  - Conventional workover (completion) unit
  - Snubbing (hydraulic workover) unit
  - Coiled tubing unit
- Compare the critical operational benefit and/or constraints of each of these methods

Workover Fundamentals [PCE-WOF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	8 hrs 50 min

The Workover Fundamentals skill module is designed to help you follow a workover process to solve well problems. It will allow you to witness how the process is being applied by using the process against a well problem. After understanding how the workover process is applied, you will have the opportunity to use the process with other resources and apply it to a given problem.

Designed for

Engineers within the first two years of a completions and/or workover role, Production operations staff, Service company engineers and managers, Drilling engineers, Reservoir Engineers, Field supervisors and managers, other asset team members who routinely work with completion or workover staff.

You will learn how to

- Explain the differences between a workover and intervention
- Provide examples of simple interventions
- Understand the purpose behind and importance of conducting workovers
- Identify the three general steps of a workover
- Identify tools used to recognize if well problems exist
- Understand the three basic classes of well problems with regard to their location
- Understand the “8 Basic Steps” to a workover
- Recognize the General Workover Design Sequence
- Recognize that the number of barriers and type of barriers can change during the course of a workover
- Recognize the more common workover problems
- Express questions and considerations that are needed to identify best workover solutions
- Understand an example thought process of design decisions behind correcting a casing leak
- Understand the basics of cement squeezing
- Recognize the application of the General Workover Design Sequence with regard to a casing repair workover
- Select possible remediation techniques for repairing casing
- Apply the general workover sequence to a well problem example to develop a workover procedure by utilizing techniques learned in previous sections
- Identify the methods utilized in performing the basic procedures in most workover designs, including killing a well, releasing and re-setting packers, and offloading the well
- Recognize blending of the workover checklist, the general workover sequence, and general workover principals to assist in the design of a workover
- Explain the necessity for contingency planning

The Role of Production Technology Core [PCE-TRP-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 55 min

Any oil and gas operation has certain key, fundamental aspects and "things that must happen" for the producing asset to be properly developed or re-developed initially and to continue to perform at its optimum efficiency and profitability throughout its life. Well-defined practices and processes must be put in place. The project team and its cumulative skill set necessary to conceive and execute what must happen are essential and indispensable for any oil and gas industry organization.

This skill module addresses the concept of Production Technology and the production technologists who define and implement the details of managing a hydrocarbon asset. Production technologists (PTs) are subject matter experts (SMEs) across all oilfield disciplines who contribute both formally and semi-formally throughout an asset's life. Their teamwork and focus continually brings both proven oilfield practices as well as prototype emerging and new technology to fruition in a hydrocarbon exploitation development.

This skill module develops the context of what PTs do, how they interact, how they function in leadership roles, and presents many types of production technology applications that are envisioned, initiated, developed in detail, implemented, and managed.

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

- Define the oilfield term "Production Technology"
- Describe the technical qualities and character of subject matter experts in oil and gas organizations who are referred to as "production technologists"
- List various common responsibilities of an industry "production technologist"
- Recall two cases of well completion design (one for an unconventional shale well and the other for a conventional sandstone well) and the generic routines that a production technologist might follow in making completion design decisions

Production Technology Applications Core [PCE-PTA-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 49 min

This skill module addresses selected applications which may be put into practice in designing and operating a hydrocarbon asset.

Both conventional limestone and sandstone reservoir examples and situations as well as unconventional shale oil and gas reservoirs and various real world applications are presented for discussion. Among various technologies presented are an overview of subsea development, well completion equipment, smart wells and smart field know-how and hardware and software, expandable tubulars, swellable elastomers, produced water shut off chemistry, surveillance practices, and other contemporary production technology advancements regularly utilized in contemporary developments throughout the oilfield.

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

- Describe examples of proven, established, historical oilfield industry Production Technology application and practices
- Describe examples of more recently developed proven, established, oilfield industry Production Technology application and practices
- Justify establishing superior oilfield data gathering practices and related data quality control, data organization, and data access methods
- Recall the history of and present day application and advancement of digitalization in the oilfield Explain the diversity of downhole well completion tool applications and the proper selection of completion equipment

Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 50 min

The goal of production logging is to obtain an accurate interpretation of downhole tool measurements of fluid holdups and fluid velocities. Achieving this goal requires an understanding of the equipment used at the well site to make these measurements and the equipment used to deploy the tools downhole. It is important to know where the tools are in the well with relation to the well components described in the well schematic. Because most production logging tools only measure what is inside the innermost casing string, it is also necessary to know when the primary cement job may be seriously degrading permitting flow behind pipe. This skill module covers well site equipment, gamma ray, casing collar and depth measurements, and acoustic methods to determine cement quality behind pipe.

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

- The basic components of surface equipment used to log a flowing well
- The basic methods used to flow a well
- The fundamental types of completions used in typical wells and the problems associated with acquiring and interpreting production log data in these types of completions
- The basic information shown in a wellbore sketch and how to use this when planning production logging jobs
- How gamma ray and casing collar tools work and how to use them to depth align production logs to open hole logs
- How wireline depth measurements are made and how they compare with pipe tallies and coiled tubing depth measurements
- How conventional cement bond and ultrasonic cement bond logging tools work, what they measure, and how to do a qualitative interpretation of cement bond quality

Prerequisite

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals [PCE-TSE-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 45 min

The goal of production logging is to obtain an accurate interpretation of downhole tool measurements of temperature, pressure, fluid holdups, and fluid velocities to determine flow rates of each phase. Achieving this goal requires understanding the measurements made by various production logging tools and how these tools make those measurements. This skill module focuses on interpretation of single-phase flow. It covers temperature logs and single-element spinner-type flow meters and how to use them to determine flow rates for single-phase flow.

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 identify fluid entries on a temperature log run in a flowing well and how to distinguish gas entries from liquid entries due to the Joule-Thompson cooling response
- How formation thermal conductivity affects the shape of the geothermal gradient
- How formation thermal diffusivity affects the rate of wellbore warm back when shutting in a flowing or injecting well
- How to calculate relative flow rates from a flowing temperature log
- How fluid heat capacity affects the shape of a flowing or an injecting temperature log
- How to identify injection intervals on an injecting temperature log and how to calculate their relative injection rates using the Ramey equation
- The different types of spinner flow meter tools and how they make their measurements
- How to identify fluid entry/fluid injection rates on flowing/injecting spinner surveys
  How to calculate flow rates from a multiple-pass spinner logging survey

Prerequisite

- Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Conventional Production Logging: Two-Phase Flow Fundamentals [PCE-TPF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 34 min

The goal of production logging is to obtain an accurate interpretation of downhole tool measurements of temperature, pressure, fluid holdups, and fluid velocities to determine flow rates of each phase. These measurements provide the only way to know for sure what is happening downhole. Achieving this goal requires understanding the measurements made by various production logging tools and how these tools make those measurements. This skill module focuses on interpretation of two-phase flow. It covers pressure, differential pressure, capacitance, focused gamma fluid density, non-focused gamma, and backscattered gamma holdup measurements, the definition and description of two-phase flow regimes, and how to use them to determine flow rates for two-phase flow.

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 identify fluid entries on pressure, differential pressure, capacitance, focused gamma density, non-focused density, and backscattered gamma logs acquired in a flowing well and how to calculate fluid holdups from these measurements
- Which measurements can be used in deviated and high angle-horizontal wells and how to interpret those measurements that can be used in these conditions
- Which measurements are preferred for gas holdup, oil holdup, and water holdup
- The basic flow regimes for two-phase flow and how to estimate when each might be occurring down hole
- How two-phase flow affects a spinner log, how to correct for it when this can be done, and when one needs measurements in addition to the conventional spinner measurements
- How to calculate two-phase flow rates from a multiple-pass spinner logging survey using one or more types of fluid holdup measurements when fluids are well mixed

Prerequisite

- Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]
- Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals [PCE-TSE-2]

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Production Logging in High-Angle/Horizontal Wells Fundamentals [PCE-PLH-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	7 hrs 55 min

The goal of production logging is to obtain an accurate interpretation of downhole tool measurements of temperature, pressure, fluid holdups, and fluid velocities to determine flow rates of each phase. These measurements provide the only way to know for sure what is happening downhole. This skill module focuses on interpretation of multiple-phase flow in high-angle to horizontal wells. Basic flow regime principles are reviewed and the effects on flow regime due to increasing well deviation are discussed. Because high-angle flow tends to be stratified in most cases, array logging tools that make multiple measurements across the wellbore profile are introduced. Two basic approaches for calculating multiple-phase flow rates in high-angle wells are presented.

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 petrophysicists who need to be able to interpret production logs or understand the production log interpretations done by others.

You will learn

- How increasing wellbore deviation increases slip velocity and heavier phase fluid holdup as well deviation increases to 90°
- Why center-weighted production logging measurements are not suitable for calculating fluid holdup and flow rates in high-angle to horizontal wells
- How gas holdup optical probes, water holdup resistance probes, and multiple-phase holdup capacitance probes work
- How array mini-spinners work
- How to calculate two-phase flow rates from a single-pass logging program using multiple holdup and spinner array measurements

Prerequisite

- Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]
- Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals [PCE-TSE-2]
- Conventional Production Logging: Two-Phase Flow Fundamentals [PCE-TPF-2]

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Advanced Nuclear Production Logging Fundamentals [PCE-ANP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	10 hrs 7 min

The goal of production logging is to obtain an accurate interpretation of downhole tool measurements of temperature, pressure, fluid holdups, and fluid velocities to determine flow rates of each phase. These measurements provide the only way to know for sure what is happening downhole. This skill module focuses on interpretation of multiple-phase flow in vertical to high angle and horizontal wells using advanced nuclear production logging techniques. Pulsed neutron capture, pulsed neutron spectroscopy, and oxygen activation measurement principles are reviewed with emphasis on those measurements that have production logging applications. Unlike conventional and array production logging measurements that can only sense what is happening inside the casing, nuclear measurements can also sense some of what is happening behind the casing.

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 pulsed neutron capture, pulsed neutron spectroscopy, and oxygen activation tools work
- How to identify formation and borehole fluid contacts and distinguish between the two
- Which measurements are used to identify formation properties versus completion effects
- How to use a pulsed neutron capture tool to log down and identify hydrocarbon/water contacts in the casing and annulus with the well shut-in
- How to interpret data and estimate flow rates from oxygen activation measurements
- How to use a pulsed neutron capture tool with gadolinium tracers to estimate oil and water flow rates
- How to determine gas and oil holdup from pulsed neutron spectroscopy measurements

Prerequisite

- Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]
- Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals [PCE-TSE-2]
- Conventional Production Logging: Two-Phase Flow Fundamentals [PCE-TPF-2]
- Production Logging in High-Angle/Horizontal Wells Fundamentals [PCE-PLH-2]

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Special Purpose Production Logging Fundamentals [PCE-SPP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	10 hrs 4 min

This skill module focuses on interpretation of special purpose production logging techniques, namely noise logging, radioactive tracer logging, and distributed temperature surveys using fiber optic cables. Noise logging principles are covered and examples of using noise logs to identify fluid entry/exit points and leaks and to distinguish single-phase from two-phase flow are given. Radioactive tracer techniques are presented, and examples are shown for calculating flow rates in shut-in and flowing wells using slug tracking and velocity shot techniques. Instrumentation is covered for fiber optic temperature measurements and some examples showing how this works are given. This skill module concludes with a lecture and an exercise on designing an integrated production logging program. Unlike conventional and array production logging measurements that can only sense what is happening inside the casing, noise, radioactive tracer, and temperature measurements can also sense some of what is happening behind the casing.

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 petrophysicists who need to be able to interpret production logs or understand the production log interpretations done by others.

You will learn

- How noise and radioactive tracer logging tools work
- How to use a noise log to distinguish between single-phase flow and two-phase flow
- How to use noise and radioactive tracer log measurements to estimate flow rates, find leaks, and find fluid entry and exit points
- Know the benefits of a spectral noise log over a conventional noise log
- How fiber optic temperature measurements are made and how to interpret them to find fluid entries and fluid exits
- How to design an integrated production logging program to solve a basic production logging problem
- How to determine oil and gas holdup in the completion from pulsed neutron spectroscopy carbon/oxygen and inelastic count rate ratio measurements

Prerequisite

- Production Logging Wellsite and Downhole Environment Core [PCE-WDH-1]
- Conventional Production Logging: Temperature and Single-Element Spinners Fundamentals [PCE-TSE-2]
- Conventional Production Logging: Two-Phase Flow Fundamentals [PCE-TPF-2]
- Production Logging in High-Angle/Horizontal Wells Fundamentals [PCE-PLH-2]
- Advanced Nuclear Production Logging Fundamentals [PCE-ANP-2]

It is recommended that the learner have previous knowledge of basic open hole logging principles.

Introduction to Unconventional Reservoirs Core [RES-IUR-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 15 min

This module introduces the Unconventional Reservoir Engineering set of skill modules. In this module, the basic terminology of all the disciplines is introduced and the fundamental reservoir characterization techniques are discussed. Also covered are the basics of reservoir management and integrated teamwork and how they are essential to proper field development.

Designed for

All petro-technical professionals who have little experience with unconventional reservoirs but who need or desire to start developing some understanding of important basic concepts and methods associated with these resource types.

You will learn

- What types of unconventional reservoirs exist
- How they are different from conventional reservoirs
- How the geologic characterization is different from conventional reservoirs
- How reservoir management is different from conventional reservoirs
- How reservoir enhancement is different from conventional reservoirs
- How reservoir surveillance is different from conventional reservoirs
- How reservoir evaluation is different from conventional reservoirs
- What constitutes a “sweet spot” in unconventional reservoirs

Unconventional Reservoir Properties Core [RES-URP-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 30 min

This skill module works through the key parameters and how they are measured in understanding unconventional reservoir rock properties. Organic, Rock and Mechanical Quality Factors are defined, and various measurement techniques are described plus an understanding of the uncertainty ranges associated with those measurements.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn

- Specifics about how Organic, Rock and Mechanical Quality is quantified
- Why each factor is important in the understanding of unconventional reservoirs
- The difference between Tight Gas Sands and Shale Reservoirs
- Uncertainties in Well and Laboratory measurements of Rock Properties

Unconventional Reservoir Properties Fundamentals [RES-URP-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 30 min

This skill module is designed for professional engineers and geoscientists with little experience in unconventional reservoirs who wish to quickly learn the key elements of these reservoirs and the technologies to exploit them. Focused on shale (tight) oil, tight gas, and coalbed methane, this course begins with an introduction to unconventionals then reviews geoscience elements from the previous modules and demonstrates their use in unconventional reservoir engineering. Fluid sampling for laboratory tests and fluid property correlations are presented. Drilling and completion of wells in unconventional reservoirs are considered, with a focus on horizontal wells. Stimulation fluid systems and proppants are briefly discussed. A key test for stimulation design, diagnostic fracture injection tests (DFIT’s) is presented along with classic test signatures. Attendees should leave this course with a better understanding of the basic physics of unconventional reservoirs and the fluids they hold as well as the basics of placing wells in those reservoirs to drain those fluids.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn

- Manage the difference between unconventional and conventional fluids
- Develop relationships between rock properties and well performance
- Calculate flow rates under conditions in which fluid models break down
- Use simulated rock volumes and discrete fracture networks

Prerequisite

- Unconventional Reservoir Properties Core [RES-URP-1]

Unconventional Reservoir Analysis Core [RES-URA-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 59 min

In this skill module, you will learn the fundamental ways that various well tests and production analyses are applied to unconventional reservoirs. Diagnostic Fracture Injection Tests (DFITs), Diagnostic Plots, Rate Transient Analysis (RTA), Decline Curve Analysis (DCA) are all historic production rate and pressure analysis tools that are being applied to unconventional reservoirs. The fundamental principles will be reviewed before the application skills are covered in the Unconventional Reservoir Analysis Fundamentals skill module. Additionally, the fundamental principles of Reserves and Resource management will be covered.

Designed for

All petro-technical professionals who have little experience with unconventional reservoirs but who need or desire to start developing some understanding of important basic concepts and methods associated with these resource types.

You will learn

- What a DFIT, RTA, DCA analysis is
- How to read a Diagnostic Plot
- Why the analysis of these techniques is different in unconventional reservoirs
- Fundamental principles of reserves and resource management

Unconventional Reservoir Analysis Fundamentals [RES-URA-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	9 hrs 32 min

This skill module is designed for professional engineers and geoscientists with a basic understanding of unconventional rocks and fluids and the drilling and completion of horizontal laterals who wish to quickly learn single well analysis techniques, including the key elements of these reservoirs and the technologies to exploit them. Diagnostic plots to identify flow regimes and rate transient analysis (RTA) to understand individual well performance are discussed. Field level topics include field development and reservoir surveillance. Decline curve analysis (DCA) for individual wells is presented followed by Reserves and Resources estimations in unconventionals, primarily under the Petroleum Resources Management System (PRMS) guidance. Attendees should leave this course with the tools to understand individual well behavior as well as field planning and development in the reservoirs which supply an ever increasing fraction of the world's oil and gas, unconventional reservoirs.

Designed for

Subsurface technical professionals, geoscientists, completion engineers, reservoir engineers, petroleum engineers, and drilling engineers.

You will learn how to

- Calculate volumetric estimates in unconventional reservoirs
- Apply material balance analysis with corrections for unconventional reservoirs
- Calculate properties from DFIT's
- Calculate drainage volumes from rate transient analysis
- Match historical data and forecast future production using statistical tools adjusted for unconventional reservoirs

Hydraulic Fracturing Core [PCE-HFC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs

The reality is that the industry began fracking conventional gas wells in 1947 in the Hugoton Field in southwest Kansas. What is relatively new is the technology and tools which allow us to place multiple hydraulic fracture stimulations along a single lateral in a horizontally drilled unconventional well.

This skill module covers basic rock mechanics, stimulation design considerations, and optimum fracture length at the core level. It covers both fracture acidizing and propped hydraulic stimulations. It reviews propped hydraulic fracturing for both the conventional sandstone reservoirs and unconventional shale reservoirs and explains why the techniques are different.

Designed for

Production Operations Staff, Reservoir Engineers, Facilities Staff Drilling and Completion Engineers, Geoscientists, Field Supervisors and Managers, Field Technicians, Service Company Engineers and Managers.

You will learn how to

- Describe the significance of rock mechanics in all relevant production engineering operations
- Describe the most common non-chemical stimulation methods, their objectives and limitations in conventional resources plays
- Describe the most common non-chemical stimulation methods, their objectives and limitations in unconventional resources plays
- Describe the basic principles of hydraulic fracturing in conventional plays, the difference between acid and proppant treatments, and how to select optimum stimulation candidates
- Describe the basic principles of hydraulic fracturing in unconventional resource plays, the difference between slickwater and cross-linked treatments, and how to select optimum stimulation candidates

Prerequisite

- Formation Damage and Matrix Stimulation Core [PCE-FDC-1]

Basic Petroleum Geology – Unconventional Petroleum Resources Core [GEO-UPR-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 10 min

This skill module introduces the petroleum geology of Unconventional Resources, which are an increasingly important part of the oil and gas industry.

The first part of the skill module explains the basic concepts of unconventional resources, and the key differences between conventional fields and unconventional resources. The geology and technological factors controlling productivity for unconventional resources are described, and essential operational technologies, including horizontal drilling and multistage hydraulic fracturing are discussed.

To highlight and reinforce the basic concepts of unconventional shale resource plays, the second part of the skill module focuses on two case studies; first, the Eagle Ford Shale Play of southeast Texas; and second, the Niobrara Shale Play of Colorado-Wyoming, as an example of a "shale hybrid play."

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in Petroleum Exploration and Production who needs to understand Petroleum Geology concepts at a basic level or to communicate with others about it.

You will learn how to

- Explain what is meant by an Unconventional Resource and how it differs from a Conventional Field
- List the geologic factors controlling productivity of Unconventional Resource plays
- Recognize the importance of Geomechanical Factors, in particular Stress Field Orientation
- Describe key aspects of Horizontal Drilling and Hydraulic Fracturing technologies as they relate to Shale Resource Plays
- Explain the concept of a Shale Hybrid Play
- Describe key technical developments that have led to increased productivity from Shale Plays and be cognizant of World Oil and Gas Shale Resource Estimates

Seismic for Unconventional Reservoirs Core [GEP-SUR-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 52 min

This skill module is designed to familiarize anyone using seismic data with how seismic data is used to explore and develop unconventional reservoirs. One of the key goals of the PetroAcademy short course is to explain the large and confusing amount of jargon that is used by the geophysical community when they use seismic data.

Designed for

Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it.

You will learn how to

- Identify rock physics for shale reservoirs
- Describe seismic analysis for unconventional reservoirs
- Describe microseismic, including surface and subsurface recording arrays
- Describe source (event) recording and location detection
- Describe three component recording
- Identify the role of Hodograms in source orientation
- Identify the importance of microseismic monitoring in different stress areas

Introduction to Petroleum Geomechanics and its Application Core [PPH-IPG-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 55 min

This introductory skill module is designed to familiarize the learners with reservoir geomechanics, its fundamentals and terminology along with exploring methodologies used for solving problems associated with different subsurface operations.

Designed for

Geoscientists, petrophysicists, completion and drilling engineers, or anyone involved in unconventional reservoir development.

You will learn how to

- Recognize the significance of rock mechanics and petroleum geomechanics in development of hydrocarbon resources and other subsurface operations
- Identify applications of geomechanics for optimization and risk mitigation for several different subsurface operations
- Use the basic terminology of petroleum geomechanics eg, in-situ stresses, pore pressure, failure criteria, constitutive models, fracture networks, and several other terms
- Describe the basic principles of rock mechanics and its problem-solving techniques for different geomechanical problems such as borehole stability, sand production, compaction and subsidence, caprock integrity, hydraulic fracturing and more

Onshore Field Development Programs and Projects Core [PRJ-OFD-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 45 min

This skill module introduces onshore petroleum development programs and projects in the upstream, midstream, and downstream segments of the petroleum industry. Development programs can span 5-10 years and are often composed of annual campaigns. These campaigns are a combination of drilling and completion activities, infrastructure projects and surface facility projects. The material presented is at the basic competency level.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- What each of the petroleum industry development segments are
- The process, characteristics and challenges associated with petroleum program management
- How project teams use the stage-gate petroleum project development system used in the industry today

Project Governance Core [PRJ-PGC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 43 min

This skill module introduces the business and organization context that frames petroleum projects development. Project governance dictates how program and project management decision making is to occur. This module demonstrates how project managers scale a company's program and project governance framework to match the type, size, and complexity of its projects.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- What good governance is
- How governance guides programs and projects, including the seven elements necessary for effective management.
- How you can adjust the stage-gate project development system using project complexity criteria

Project Resources and Organization Core [PRJ-PRO-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 30 min

This skill module discusses how you can select and organize resources in each stage of development. Key issues that affect organization design and personnel selection ae examined. We will also explore competency and how to build high performing teams.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- The key roles and responsibilities of the project sponsor, project manager, decision board, and integrated team members
- Explain what an organization breakdown structure is and describe the advantages & disadvantages of the matrix- and task-force types of project organizations
- Explain the concept of project manager competence and describe the skills needed in the technical, business, and leadership skill areas
- List the characteristics of a high performing team and describe the key steps in a conflict resolution process

Scope Delivery Core [PRJ-SDC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 28 min

This skill module describes how to validate a scope of work for a project and the coordinate the discipline plans necessary to complete the execution stage. The module addresses the project execution plan (PEP) contents, including the Staffing plan, HSE Plan, Scope of Work, Risk Management Plan, Budget, Schedule, and EPC phase details. The module includes preparations tips for the PEP.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- How to create a plan for developing a scope of work for your project
- The process for developing a sound project scope statement using the project charter and the preliminary scope statement
- How to verify a scope of work using a work breakdown structure
- Explain what a project execution plan is and how the team uses it to deliver the scope of work
- How to use the project execution plan to facilitate scope delivery

Design Engineering Management Core [PRJ-DEM-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 53 min

This skill module describes how completion of key engineering deliverables, careful design control, and the use of value improving techniques, results in facility designs that meet the needs of key business and operations stakeholders.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- How engineering design progresses through each development stage of the project development system
- How to improve the value of a project by selecting Value Improving Practices that focus on key value drivers such as cost, schedule, operability, and maintainability
- Explain why validation and verification of design engineering deliverables is a best practice
- Techniques for controlling the facility engineering design effort

Acquiring Goods and Services Core [PRJ-AGS-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 33 min

This skill module is an introduction to procurement and contracting for the equipment, materials and services needed for development of petroleum projects. One module subsection addresses procurement by owner organizations, including sourcing, transportation, and materials management. Additionally, participants become familiar with the distinct types of contracts used for project development. The module addresses the contracting process and factors for successful contract placement.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- The five major procurement functional areas and how each area facilitates procurement of quality equipment, materials, and supplies in a timely manner for a project
- The key activities of each of the following procurement topics and describe the activities associated with each one: Procurement Planning, Purchasing, Tracking Manufacturing, Logistics Management, Site Materials Handling
- Describe the major activities in the joint service buyer and seller contracting process

Construction Management Core [PRJ-CMC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 34 min

This skill module is an introduction to construction planning and site management for projects associated with petroleum developments. The module introduces key aspects of construction planning and contractor selection. Module subsections address advanced work packaging, site HSE management, quality control and project closeout.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- How to effectively manage the construction initiation and execution process
- How the structured development of work packages helps maintain good jobsite labor productivity
- How to maintain good jobsite labor productivity through the structured development of work packages
- The benefits of construction quality control tools and techniques

Project Risk Management Core [PRJ-RMC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 41 min

This skill module introduces techniques and tools needed to identify and manage risks typical of petroleum projects. Topics include the risk management process: identifying, characterizing, and ranking risks, and developing mitigation strategies. The module describes how to use a risk register for assigning accountability and monitoring mitigation progress.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- How volatility, uncertainty, complexity and ambiguity make managing petroleum project extremely challenging
- How to use a five-step process to identify and manage petroleum project risks
- When best to use qualitative and quantitative risk assessments

Cost Estimating for Facility Projects Core [PRJ-CEC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 32 min

This skill module introduces key aspects of cost estimating, including estimate preparation and uncertainty assessment. Participants learn about the types of cost estimates, along with their uses and requirements at each succeeding stage of project development. Module coverage includes selected topics in labor productivity, owner's costs, and contingency management.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- For each phase of project development, the name the estimate produced, its use, and the methodology used to create it
- How to guide the development of the definitive cost estimate that needed to secure full funding for a petroleum project
- Describe what estimate assurance is and briefly describe the steps in the assurance process

Scheduling Core [PRJ-SCC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 33 min

This skill module is an introduction to planning and scheduling for petroleum development projects. It describes how to create the distinct levels of critical path schedules needed to meet project planning, control, and reporting needs for a variety of stakeholders.

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- The difference between planning and scheduling
- The process for developing a critical path schedule and the purpose of each step
- How to use only validated and approved information to read create an informative, high-quality schedule
- Describe what a baseline schedule is, including who prepares it, when to prepare it, and how the PM can use it

Progress Measurement Core [PRJ-PMC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 11 min

This skill module describes how to establish project progress measurement, tracked it on a regular basis, and report performance to key stakeholders. The module covers the five methods used to assess design engineering and field construction progress. It also introduces the concept of earned value analysis (EVA).

Designed for

Personnel working on development projects in the upstream, midstream, downstream, and transportation segments of the petroleum industry. This includes project managers, project engineers, facility engineers, production and operations engineers, wellsite supervisors, project controls representatives, and supply chain personnel.

You will learn

- How to describe the different approaches used to measure project progress and give examples of their use
- The concept of earned value analysis including how it to determine schedule and cost variance
- How to estimate the final cost of a project given the project budget, earned value and actual costs to date

Production Forecasting Core [PEB-PFC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 37 min

This skill module sets the stage for understanding the business of making decisions in the oil and gas business. Key to making economic decisions is understanding how much oil and gas are anticipated to be produced each year of a project. Using multiple methods, this skill module demonstrates and develops the understanding of how oil and gas production behaves over time, and how to forecast the levels of production over time.

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

- Forecast annual oil and gas production using exponential and constant percentage decline methods
- Forecast total production over the life of a project
- Calculate the economic limit when analyzing a project
- Use multiple methods to accurately forecast well and field production

Oil and Gas Pricing Core [PEB-OGP-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 26 min

This skill module demystifies oil and gas pricing. Is that possible? The answer is yes, and this skill module clarifies the factors contributing to how oil and gas pricing is determined. The tools and methods in common use for managing oil and gas pricing are described and participants will practice developing and applying pricing models. These models will contribute to the basis for an economic analysis and understanding of projects as companies make decisions in the real world.

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

- Calculate crude prices taking into account API gravity and sulfur content
- Apply quality bank methods to forecast relative prices
- Inflate prices over the life of a project
- Apply marker crude methodology to forecast oil prices

Cash Flow Core [PEB-CFC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 32 min

This skill module forms the skeleton for understanding how a project will be valued. Forecasts for oil and gas volumes, price forecasts, inflation are incorporated to forecast how much money a project will generate. From calculating oil and gas revenue this skill module addresses royalties, operating expenses, capital expenses, operating taxes and other expenses.

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

- Construct a revenue model
- Develop a full cash flow model
- Calculate net cash flow
- Distinguish between cash flow for concessions and production sharing contracts
- Produce robust flexible cash flow forecasts

Economic Decision Tools Core [PEB-EDT-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 12 min

This skill module addresses the need for economic evaluation criteria for petroleum projects. How can one project be compared to another when the projects are in different regions or offshore versus onshore or gas versus oil? In the purest sense, economic evaluations are independent of the details of a project and focus on the particular economic inputs such as capital investment needed, operational expenses, royalty rates and, ultimately, the economic outcomes using comparative economic metrics to evaluate projects and make decisions.

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

- Calculate compound interest
- Determine present values for future cash flows
- Evaluate NPV, DROI, IRR
- Choose the right economic metric
- Use economic decision tools to evaluate projects

Risk and Uncertainty Core [PEB-RUC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 40 min

This skill module addresses how to handle risk and uncertainty, which are always factors to consider when forecasting production, cash flow or economic outcomes. It provides clear definitions of risk and uncertainty, enabling the audience to identify different types of risk. The module demonstrates how probabilistic analysis works and how the modeling methods provide means for describing scenarios with a variety of possible outcomes.

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

- Identify different types of risk
- Model risk and uncertainty
- Use mathematical methods to quantify risk
- Handle sunk costs and tax credits when considering risk
- Recognize and use probabilistic uncertainty models
- Recognize uncertainty in economic analysis

Financing and Ownership Core [PEB-FOC-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 55 min

This skill module explores financial aspects of how oil and gas companies manage the business of funding projects. Where do oil companies get the capital to explore for oil and gas? Do oil companies borrow money to develop projects? How much interest do they pay? What is the hurdle rate and why is it similar for almost all oil companies regardless of whether a large integrated company or an independent upstream company? These are some of the financial issues covered in this skill module.

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

- Calculate the average cost of capital for a typical oil company
- Recognize the drivers for a company's hurdle rate
- Determine the opportunity cost of capital

Petroleum Industry Accounting Core [PEB-PIA-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 31 min

This skill module explores the difference between accounting and economics – and there is a world of difference. Oil and gas companies need both accountants and economists to run their businesses and they serve different functions within a company. But even beyond serving different functions they speak different languages and live in different worlds. In this skill module, we gain an appreciation for accounting terms, methodology and, most importantly, clarify the differences between accounting and economics.

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

- Interpret the financial accounting section of annual reports
- Calculate depreciation, depletion, and amortization (DD&A)
- Separate cash flow from profit
- Recognize non-cash charges
- Focus on cash flow when selecting economic metrics for project evaluation

Budgeting Core [PEB-BUC-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 47 min

This skill module is a guide through the most important activity an oil and gas company undertake. More important than exploring for oil or operating existing assets? Yes, and this skill module explains why that is true. When it comes to the big picture of economics, budgeting suddenly takes center stage and displays its power to drive economic success. Budgeting is where economic success is incubated. In this skill module, budgeting methodology is explained, and the contribution economic evaluation tools make to the process is clarified.

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

- How to screen projects for inclusion into the capital budget allocation
- How to economically rank projects
- Accommodate legal, safety and regulatory impacts to capital budgets
- Think like an executive when evaluating capital budget allocation to projects and corporate functions

Decision Analysis Process Core [PEB-DAP-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 15 min

Is there anything more important to success than good decision making? This introductory topic provides an overview of the discipline and problem-solving approach of decision analysis. The most common business application is the capital investment decision. Back-of-the-envelope calculations are sufficient for most everyday decisions, such as whether and how to spend money and time.

Designed for

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

You will learn

- Decision Analysis Process
  This lesson recommends a 10-step process, ranging from identifying a decision opportunity to the post-decision review. This is much like a typical problem-solving process as in engineering design. The added feature is formal value calculations using stochastic (probabilistic) methods.
- Expected Value Calculation Tools
  Decision trees and Monte Carlo simulation are the principal tools for calculating expected values. Though both methods solve for expected values, they do so in very different ways. Each method has its advantages and disadvantages, and often both methods serve different parts of an analysis.
- Influence Diagrams and Structural Decision Trees
  Developing a structural decision model is a good practice and is often an output of decision framing.

Value of Control Fundamentals [PEB-VCC-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	4 hrs 4 min

This skill module introduces value of control and covers the following topics:

- **Decision Trees – Expanded**. Decision trees are the most recognizable feature of decision analysis. So, many people think these are synonymous.
- **Value of Control I.** Investing to reduce project and operations risk are typical value of control (VOC) problems. Improving "control" means taking action to improve the probability and/or outcomes of a chance event.
- **Value of Control II.** An oil tanker has a heightened risk of collision accidents and oil spills if it loses its steering or propulsion power system. This exercise is to develop a decision model to decide whether to spend additional money on maintaining the tanker's steering and propulsion systems.

Designed for

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

You will learn how to

- To properly sequence decision tree nodes
- To back-solve the decision tree for node-branch expected values
- When it is okay to put costs and benefits on branches when realizing those values
- Exercise: Plant expansion decision
- Low- to moderate-cost software tools
- Advantages and disadvantages of decision trees compared to Monte Carlo simulation
- The distinction between threats and opportunities in project management terminology
- About the risk matrix (useful to illustrate the VOC concept, though not recommended for decision making)
- To set up and solve a decision tree to evaluate the value of a control-adding alternative
- How to apply Monte Carlo to optimize one or multiple control decision variables
- To calculate the expected value (EV) cost of an accident
- How to set up a decision tree to evaluate the EV cost of an accident vs amount spent on maintenance
- Calculate the EV cost of an accident with Low Maintenance plus Insurance

Value of Information and Bayes' Rule Fundamentals [PEB-BRC-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	4 hrs 1 min

This skill module introduces value of control and covers the following topics:

Probability Types, Venn Diagrams, and Probability Rules
Venn diagrams and probability trees are good ways to explain the foundation probability rules. Bayesian analysis is central to information applications. Machine learning and variants are central to popular artificial intelligence methods, such as natural language processing. Typical investment decisions seldom have much data and rely instead on expert judgments. Bayes' rule calculates revised probabilities based on new information. Becoming comfortable with Bayes' rule calculations requires practice for most people to develop a deep intuition about how the calculations work.

Designed for

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

You will learn how to

- Explain causes of correlation between variables and ways to discover from data
- Perform Bayes' Rule calculations for conditional probabilities using the formula or equivalent methods
- Explain marginal, joint, and conditional probabilities and illustrate with Venn diagrams and probability trees
- Explain how Bayes' rule is valuable even with noisy or sometimes corrupt information
- Develop decision trees to value imperfect information (VII)
- Extend a VOI analysis to include a flexibility option and calculate the value of flexibility (VOF)

Judgments and Biases Fundamentals [PEB-JBC-2]

STATUS	LEVEL	DURATION
Coming Soon	Fundamentals	~4 hr

Designed for

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

You will learn

- Judgments and Biases
  Analysis quality depends mainly on the quality of inputs, and some of the inputs may be highly subjective. We rely upon subject matter experts (SMEs) to judge input probabilities and input distributions. We also ask SMEs to describe relationships (perhaps physical laws) so that we can model correlations.
- Calibration Exercises
  Most people are poorly calibrated and overestimate the quality of their information and knowledge. It is common for outcomes to miss the 80% confidence range. With practice and feedback, most people greatly improve their calibration.
- Judgment Elicitation
  Typically, one or two interviewers will elicit a distribution or probability judgment from one or several subject matter experts (SMEs). Thinking through what questions you would ask as an interviewer will prepare you for the role. Similarly, thinking about what questions someone might ask you will help if the role is reversed. The exercise assumes that you are interviewing an oil price expert to assess the oil price (WTI, Brent, or other index) three years from now.

Decision Policy and Value Calculations Fundamentals [PEB-DPV-2]

STATUS	LEVEL	DURATION
Coming Soon	Fundamentals	~4 hr

Designed for

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

You will learn

- Decision Policy Components
  This course mostly focuses on maximizing shareholder value, measured as expected monetary value *(EMV)*, which is risk-weighted (expected value) *NPV*. See Social Factors, below, about adding-in non-monetary metrics.
- Time Preference
  When costs and benefits occur across time, the time value of money is an important consideration. Present value discounting converts future cashflows into an equivalent amount today or the reference time of investment. Price escalation and inflation work similarly. Most people—even professional analysts—do the calculations incorrectly. PV discounting applies also to non-monetary metrics where the company has time preference.
- Social Factors in Decision Policy
  A multi-criteria decision policy may include metrics for non-monetary criteria in such areas as Health, Safety, and Environment (HSE), Corporate Social Responsibility (CSR), and Environment, Social, and Governance (ESG).
- Establishing a Risk Tolerance Coefficient for Risk Policy
  The exponential utility function is an easy-to-use representation of risk policy. Expressing risk policy in this form requires only assessing the risk tolerance coefficient for the company or individual decision maker. Risk policy facilitates logical, consistent trade-offs between value and risk.

Monte Carlo Simulation and Distribution Fundamentals [PEB-DIS-2]

STATUS	LEVEL	DURATION
Coming Soon	Fundamentals	~4 hr

Designed for

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

You will learn

- Discrete and Continuous Distributions and their Statistics
  Judged and solved-for distributions are at the heart of stochastic (probabilistic) analysis. This module identifies and contrasts each type.
- Common Named Distributions
  There are dozens of named distributions, and organizations sometimes define their own specialty ones. This topic describes the more common distributions and their applications.
- Monte Carlo Simulation Details
  Probability algebra is limited in working with uncertainty. Monte Carlo simulation (MCS) allows mathematical operations on probability distributions. This topic expands to what you need to know.

Introduction to the Digital Oilfield Core [DSA-IDO-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 8 min

We will start by introducing the Digital Oilfield, what it is, how it developed and what the future of digital technology and data analytics in the oilfield might bring. The Digital Oilfield is a reality, but it is taking on new forms shaped by emerging digital technologies, improved data visualization and advanced analytics techniques.

Designed for

This is not a course for new data scientists but focuses on the rest of the engineers, geoscientists and data analysts who want to and need to understand how this field is evolving.

You will learn

- Physics, statistics and explainable AI
- Digital oilfield 2.0 (what's different this time)
- What's the big deal about big data and data science

Operational Technology and Field Networks Core [DSA-OTF-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 53 min

The digital oilfield has brought together systems in the field with corporate financial systems and headquarters engineering experts in order to improve the overall performance of the producing asset from reservoir to surface production facilities to the sales or export market. The field systems grew up in a different environment than the corporate IT systems, so the integration of these disciplines is taking some time to perfect, and some interesting challenges present themselves along the way.

Designed for

This is not a course for new data scientists but focuses on the rest of the engineers, geoscientists and data analysts who want to and need to understand how this field is evolving.

You will learn

- The convergence of OT and IT
- Digital field instrumentation and control system networks (SCADA)
- Enterprise system thinking and design

Digital Oilfield Challenges, Barriers to Adoption, and Risks Core [DSA-DOC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 36 min

In this skill module, we cover the enabling technology and IT infrastructure aspects of the digital oilfield through an understanding of the history of how the digital oilfield evolved (5 stages of digitization), the importance of a good data foundation, challenges in the adoption of digital solutions, and the threat from cybersecurity malware.

Designed for

This is not a course for new data scientists but focuses on the rest of the engineers, geoscientists and data analysts who want to and need to understand how this field is evolving.

You will learn

- Five stages of digitization of the oilfield
- Challenge to adoption and lessons learned
- Physical and cybersecurity challenges

Data Foundation for the Digital Oilfield Core [DSA-DFD-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 35 min

Data is an often neglected aspect of Petroleum Data Analytics projects. We are excited to get started building a predictive model given the new artificial intelligence/ machine learning techniques but if we rush over the data profiling steps, not understanding the possible inherent bias of our data sets, we can create very sophisticated but not very useful models. Remember the old adage "garbage-on, garbage-out." Effective data visualization techniques can help us tell an important story with the data and highlight new insights into operational systems. But on the other hand poor data visualization methods can allow an unsuspecting analysts to "lie with data."

Designed for

This is not a course for new data scientists but focuses on the rest of the engineers, geoscientists and data analysts who want to and need to understand how this field is evolving.

You will learn

- Current data management practices, silos, clouds and lakes
- The truth about drilling and field sensors
- Data visualization and communications challenges (data storytelling)

The Future of the Digital Oilfield Core [DSA-FDO-1]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

There will be many factors that will influence the future of oil and gas operations, including technology trends, economics, market forces and demand for oil and gas products. What will the future digital oilfield look like? What will be the role of the future petroleum engineer? There are not right or wrong answers to this question and many factors that today are uncertain. But the best way to predict the future is to invent it.

Designed for

This is not a course for new data scientists but focuses on the rest of the engineers, geoscientists and data analysts who want to and need to understand how this field is evolving.

You will learn

- Emerging trends in digital technology
- Integrated operations and minimally manned facilities
- The role of digital twins and artificial intelligence (AI), automation and autonomy

Introduction to Data-driven Workflows Core [DSA-IDW-1]

STATUS	Level	Duration
Coming Soon	Core	~4 hrs

This module introduces data-driven modeling, including its connection to machine learning. We will examine the rising applications of machine learning in different sectors of the economy and how this impacts daily life. Learners will then focus on the principle modes of machine learning with a discussion of a few select use cases where machine learning is providing new insights into data or streamlining operations. Data-driven modeling relies on quality data, and we will illustrate key steps to visualize and examine data as a central component of a machine learning workflow.

Designed for

Geoscientists, petrophysicists, engineers, or anyone interested in subsurface engineering and geoscience applications of machine learning and data analytics.

You will learn

- Define and describe machine learning
- Discuss the adoption of machine learning and data-driven modeling in our industry, including potential strengths and obstacles
- Identify the modes of machine learning and what distinguishes each
- Recognize the main forms of supervised learning
- Conceptualize applications of supervised learning
- Describe unsupervised learning and what distinguishes it from supervised learning
- Conceptualize applications of unsupervised learning
- Identify different data types
- Recognize sampling methods and their pitfalls
- Be able to interpret various measures of univariate statistics
    - Measures of central tendency
    - Measures of spread
    - Visual representations of data
    - Handling of outliers

Hydrocarbon Components and Physical Properties Core [GAS-HCP-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 18 min

This skill module describes the basic terminology and hydrocarbon nomenclature commonly used in the oil and gas industry. This skill module also explains methods used to determine hydrocarbon fluid composition and approaches to and implications of the characterization of heavy hydrocarbons (C6+) in mixtures. This module also demonstrates how to estimate hydrocarbon physical properties (density and viscosity) for both liquids and vapors, including their purpose and use as applied in facilities engineering calculations.

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.

You will learn how to

- Describe the concept of atomic mass, molecular mass, and the mol
- Identify the four main hydrocarbon groups
- Practice the concept of relative density
- Discuss how a gas chromatograph works, the limitations of various analysis methods, and the difference between an extended analysis and a standard gas chromatographic analysis
- Recognize the uncertainties involved with characterizing the C6+ components in a natural gas, condensate or crude oil stream, and describe the relationship of these factors with hydrocarbon liquid composition
- Describe an Equation of State, its purpose and uses
- Define standard (normal) conditions for SI and FPS units, and calculate the molar volume at these conditions
- Describe the gas compressibility factor and use it to calculate gas density
- Define the property “viscosity”, list applications where it is used, and describe correlations that can be used to predict its value
- Estimate the density of a hydrocarbon liquid at a specified temperature and pressure

Introduction to Production and Gas Processing Facilities Core [GAS-IGC-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 48 min

This module provides an overview of production and gas processing facilities. The concepts addressed in this module include: 1) the crude oil and natural gas value chains, 2) common contaminants in production streams, 3) crude oil, produced water and natural gas quality specifications, 4) typical production facility and gas processing schemes, and 5) NGL products the economics of their recovery. Knowledge of these basic concepts is critical to understanding the selection and specification of processing facilities between the wellhead and product markets.

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.

You will learn how to

- State typical crude oil and produced water specifications
- Describe process flows for each stream in production facilities
- List problems associated with and strategies to deal with solids production, e.g., sand, wax, asphaltenes
- List the components, including contaminants, found in produced gas streams
- State typical natural gas sales or transportation specifications
- Calculate higher heating value and Wobbe number
- List the products of a typical natural gas processing plant, their associated markets, and describe common terminology
- Describe typical process flows for each stream in gas processing facilities
- Explain the difference between gas conditioning to meet a HCDP specification and gas processing to recover NGLs
- Describe shrinkage and how it is calculated

Qualitative Phase Behavior and Vapor Liquid Equilibrium Core [GAS-QPB-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 27 min

This skill module describes the phase or phases that exist at given conditions of pressure and temperature of single and multi-component systems. The skill module also explains the concepts of critical point, cricondentherm, cricondenbar, dense phase, and retrograde condensation. In addition, the module explains how to perform bubble point, dew point, and flash calculations, and describes how to stabilize hydrocarbon liquids using stage separation.

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.

You will learn how to

- Describe pure component phase behavior
- Describe multicomponent phase behavior and phase envelopes
- Define critical point, cricondentherm, cricondenbar, dense phase, and retrograde condensation
- Summarize the effect of C6+ characterization on the shape of the phase envelope
- Recognize the effect of various non-hydrocarbon components on the shape of the phase envelope
- List examples of fundamental applications of phase envelopes in facilities design and operations
- Explain the concept of equilibrium vaporization ratio, K
- List the common methods of estimating K values
- Describe flash, bubble point, and dew point calculations and list examples of their application
- Describe the effect of composition on bubble point, dew point, and flash calculations for a hydrocarbon mixture
- Describe stabilization of hydrocarbon liquids using stage separation
- Summarize the differences between Reid Vapor Pressure (RVP) and True Vapor Pressure (TVP)

Water/Hydrocarbon Phase Behavior Core [GAS-WHP-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 10 min

This skill module describes hydrates, explores conditions favoring hydrate formation, and discusses how to prevent hydrates from forming. The skill module also describes how to estimate the hydrate formation temperature of a natural gas stream and the key differences between low dosage hydrate inhibitors and thermodynamic inhibitors.

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.

You will learn how to

- Estimate the water content of sweet and sour natural gas
- Describe the conditions that favor hydrate formation
- Estimate the hydrate formation temperature of a natural gas stream
- Compare and contrast the use of MeOH and MEG to prevent hydrate formation
- Describe the differences between low dosage hydrate inhibitors and thermodynamic inhibitors

Thermodynamics and Applications of Energy Balances Core [GAS-TAE-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 42 min

This skill module provides an overview of the concepts of thermodynamics, which is the foundation for all processing calculations. This skill module explains the first and second law of thermodynamics and their application in facilities. Also covered are applications of energy balance equations, the concepts of enthalpy and entropy, and an explanation of how to use P-H diagrams to perform calculations on a simple refrigeration system.

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.

You will learn how to

- Define the terms system and surroundings and explain the difference between open and closed systems
- State the first law of thermodynamics and how it is applied to facilities
- Describe the second law of thermodynamics, and explain how it is applied to facilities
- Write the energy balance equations for a heat exchanger, valve, separator, and compressor
- Calculate the duty of a heat exchanger where no phase change occurs and also for an exchanger where a phase change does occur
- List methods used to estimate enthalpy and entropy
- Describe a P-H diagram and use it to perform calculations on a simple refrigeration system

Fluid Flow Core [GAS-FFC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 3 min

This skill module discusses the flow of fluid through a pipe segment. Single phase and multiphase flow are explored. In addition, simple correlations are used to estimate important fluid flow parameters.

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.

You will learn how to

- Explain Bernoulli's equation, including how to estimate and apply the friction factor
- Describe the difference between Newtonian and non-Newtonian fluids
- Explain economic pipe diameter and describe typical velocity and pressure drop guidelines for sizing piping systems
- Calculate fluid velocity and estimate the pressure drop in a plant piping system using simple correlations
- Describe common gas transmission pipeline flow correlations and their applications
- Describe the parameters that affect heat transfer for various piping systems
- Describe the most common flow regimes in multiphase flow systems
- Explain the difference between liquid hold-up and liquid volume fraction and list factors that affect their value
- Describe common slugging mechanisms and list methods to limit or reduce the impact of slugging events
- Describe erosional velocity and explain how it can be estimated for various systems

Separation Core [GAS-SEC-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 24 min

This skill module describes separators, their use and application, in the oil and gas industry. The principle of gas-liquid and oil-water separations are discussed along with separator sizing. This module also explains what emulsions are, how they form, and their influence on separator design. Also discussed are methods and equipment used to destabilize and eliminate emulsions.

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.

You will learn how to

- Describe separator applications and common types of separators
- List the sizing criteria for 2-phase and 3-phase separators
- Discuss the principles of gas-liquid separation and how they are applied in separator design
- Describe the effect of inlet piping size and inlet devices on separator sizing
- List the types of mist extractors and describe typical applications
- Estimate separator size based on gas-liquid separation criteria
- Describe emulsions, how they form, and how they influence separator design
- Discuss how emulsions can be destabilized and eliminated
- Estimate the size of an oil dehydrator based on liquid-liquid separation criteria

Heat Transfer Equipment Core [GAS-HTE-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 16 min

This module provides an overview of the heat transfer equipment and mechanisms commonly used in the oil and gas industry. The module also provides an overview including advantages, disadvantages, and applications of different types of heat exchangers.

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.

You will learn how to

- Identify types of heat exchangers and common applications in oil and gas processing facilities
- Describe heat transfer mechanisms: conduction, convection, and radiation
- Define heat transfer coefficient and describe the primary parameters that affect its value
- Describe the rate equation used to calculate heat transfer area
- Describe the “effective temperature difference” and explain how it affects heat transfer area
- Estimate heat transfer surface area required for a heat exchanger application
- Describe shell and tube exchanger types and applications
- Describe compact heat exchangers and fired heaters
- List the four primary process cooling (heat rejection) methods
- Describe why air-cooled heat exchangers are so frequently used, key operating parameters, and the difference between induced draft and forced draft designs

Refrigeration, NGL Extraction, and Fractionation Core [GAS-RNG-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 9 min

This skill module explains the concepts of mechanical refrigeration, valve, and turbine expansion, and NGL extraction systems. The skill module also explains the process of fractionation in oil and gas operations.

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.

You will learn how to

- List the most common applications of refrigeration in oil and gas processing
- Review the operation of a mechanical refrigeration system, and describe the effect of condenser and chiller temperature on compressor operation and energy consumption
- Explain why economizers are commonly used in mechanical refrigeration systems
- Describe factors that are considered in selection of a refrigerant, and explain cascade refrigeration and why it is used
- Explain the operation of expansion refrigeration processes (valve and turboexpander)
- List the common process configurations for the different levels of NGL extraction (including HCDP control)
- Understand the difference between stage separation and fractionation
- Define relative volatility and how it affects the difficulty of separation
- Explain how a fractionator (distillation column) separates components, and describe the operation and purpose of the reboiler, condenser, reflux accumulator, and pump
- List types of internals used in fractionators to achieve mass transfer, and describe their advantages and disadvantages

Pumps and Compressors Core [GAS-PCC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 22 min

This skill module provides an overview of types of pumps and the basic principles and criteria that apply to all pumps. The emphasis is on process-type pumps used in surface facilities. The concepts of Cavitation, Net Positive Suction Head Required (NPSHR), and Net Positive Suction Head Available (NPSHA) are also discussed. The second important focus in this skill module is compressors, including their applications, types, and selection criteria. The skill module ends with a discussion of the principles of operation of the various types of compressors.

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.

You will learn how to

- Identify types of pumps and common applications in oil and gas processing facilities
- Describe how a pump selection chart can be used to select pump type
- Explain the relationship between head and pressure
- Calculate the pump power requirement
- Describe the differences in performance characteristics of centrifugal and positive displacement pumps
- Describe cavitation
- Define NPSHRS and NPSHA
- Explain the principle of operation of a single stage centrifugal pump, and identify the main pump components
- Describe the system head curve and explain how it affects pump selection
- Explain the principle of operation of plunger pumps, common configurations, and identify the main pump components
- Identify types of compressors and common applications in oil and gas processing facilities
- Describe how a compressor selection chart can be used to select compressor type
- Explain the relationship between compressor head and pressure
- Calculate the compressor power requirement
- Estimate the compressor discharge temperature
- Explain the principle of operation of a centrifugal compressor, and identify the main compressor components
- Describe a centrifugal compressor performance curve, and identify and describe the surge line and stonewall
- Explain the principle of operation of a reciprocating compressor, and identify the main compressor components
- Explain the principle of operation of a rotary screw compressor, and identify the main compressor components
- List common drivers used for each compressor type

Contaminant Removal – Gas Dehydration Core [GAS-CRD-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 31 min

This skill module provides an overview of processes used to dehydrate natural gas with specific emphasis on (1) Absorption using glycol dehydration and (2) Adsorption using molecular sieve.

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.

You will learn how to

- List the three most common gas dehydration options used in oil and gas processing
- Identify typical applications
- Describe the advantages and disadvantages of each
- Describe the components and process flow in a typical glycol dehydration unit
- State the typical TEG circulation ratios for a glycol dehydration system
- Determine the minimum lean TEG concentration required for a given water removal requirement
- Calculate the volumetric TEG circulation rate based on a given water removal requirement
- Describe the effect of the number of trays or height of packing on the contactor performance
- Describe the sizing parameters for the contactor and regeneration system
- Describe the co-absorption BTEX, H2S, CO2 and the TEG, and list the methods to mitigate emissions
- Explain the process of adsorption
- List the common adsorbents used in gas dehydration
- Describe the typical adsorption dehydration cycle for a molecular sieve unit
- Describe the factors that cause the useful capacity of the sieve to be less than the new equilibrium capacity
- List the parameters that affect the sizing of the adsorber vessels
- Describe the mol sieve regeneration process and factors that affect its design and operation

Contaminant Removal – Acid Gas and Mercury Removal Core [GAS-CRA-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 56 min

This skill module explains the processes of removing mercury and acid gases from a natural gas stream. The skill module also describes the basic amine process flow diagram (PFD) and explains the advantages of using MDEA for removing H2S but leaving CO2 in the gas stream. Also discussed are when to use a Claus sulfur recovery unit (SRU) and a tail-gas-clean-up unit (TGCU) versus acid gases injection and why liquid product treating may be required.

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.

You will learn how to

- Explain why mercury is removed from a natural gas stream, and list two common mercury absorbents
- List the process options for acid gas removal from a natural gas stream
- Describe a basic amine process flow diagram
- Estimate the amine circulation rate, regenerator reboiler duty, and circulation pump power for an AGRU
- State the conditions where a physical solvent may be advantageous over an amine solvent for acid gas removal
- List examples where it may be advantageous to selectively remove H2S from a gas stream but leave some or all of the CO2 in the gas
- Describe the process flow diagram for a standard Claus sulfur recovery unit (SRU)
- Explain why a tail-gas-clean-up unit (TGCU) may be required, and list processes that may be applied
- Describe why liquid product treating may be required, and provide examples of common processes used
- List the advantages of acid gas injection over installation of an SRU and TGCU

Process Safety Risk Analysis and Inherently Safer Design Core [PRS-PSR-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 47 min

This skill module provides basic concepts and definitions needed to better understand and utilize Process Safety and Inherently Safer Design. This skill module also includes various models, strategies, and examples to better analyze and reduce risk and apply Inherently Safer Design.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- How to analyze and assess different types of risk analyses
- How to utilize models that are associated with risk management
- The importance of building safety into processes
- How Inherently Safer Design can be applied

Process Hazards Analysis and Layers of Protection Analysis Core [PRS-PHA-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 10 min

This skill module addresses Process Hazards Analysis (PHA) and Layer of Protection Analysis (LOPA). It will cover PHA definitions, concepts, and techniques, as well as the definition and purpose of LOPA and the LOPA procedure.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- The purpose, premise, and scope of a PHA
- PHA methodology, including HAZOP and API14C
- The differences between methods, including benefits and disadvantages
- The purpose and steps of a LOPA procedure
- The role of independent protection layers and conditional modifiers in LOPA

Leakage and Dispersion of Hydrocarbons Core [PRS-LDH-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 11 min

This skill module covers accidental leaks and calculating concentration and dispersion of those leaks. This skill module also discusses how calculations can be made to keep people safe from exposure to leaks and what the risks are when working around hazardous materials.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- Detect the conditions in which accidental release can occur, and identify the factors that affect the amount of release
- Assess gas and liquid leak rate equations
- Estimate vapor cloud size
- Describe the factors associated with gas dispersion
- Analyze the risks of Hydrogen Sulfide and oxygen deficiency on people
- Estimate downwind concentration of a leaked gas
- Estimate probability of fatality from exposure to a material
- Assess probit function and estimate probability of fatality using the function

Combustion Behavior of Hydrocarbons Core [PRS-CBH-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs

This skill module covers combustion behavior of hydrocarbons. It will review vocabulary, concepts, and the factors that drive calculations regarding combustion behavior.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- The fundamentals of flammability and flammable limits typical of hydrocarbons
- The characteristics of hydrocarbon fires and explosions
- Essential variables in calculations of typical fire and explosion scenarios

Sources of Ignition and Hazardous Area Classification Core [PRS-SIH-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 50 min

This skill module covers two main sections, Sources of Ignition and Hazardous Area Classification. The Sources of Ignition section looks at electrical and non-electrical sources along with their controls. Non-power ignition is also included as an independent section regarding the sources of ignition. The Hazardous Area Classification section illustrates the fundamental purposes of HAC and the standards that are available.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Identify the ignition characteristics of fuel
- Explain the probability of leak ignition by release rate category
- Identify common non-electric sources of ignition
- Indicate the primary controls for non-electric sources of ignition
- Describe how electrical equipment can become a source of ignition
- Describe Hazardous Area Classification and design alternatives
- Identify the purpose of Hazardous Area Classification
- Compare IEC and US standards of Gas groups
- Describe the correlation between area classification and risk assessment
- Identify and describe non-power electrical ignition sources
- Identify non-power ignition controls

Specific Plant Systems and Equipment Core [PRS-SPS-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 26 min

This skill module covers several sections, including piping systems, storage facilities, pumps and compressors, heat exchangers, and pressure vessels.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Define the piping system and identify the components associated with it
- Explain why piping systems have a high incident rate and identify its failure modes
- Identify different types of flanges and their main types of failures
- Analyze an incident to determine its failure modes and how they could have been eliminated
- Discuss the main issues that arise from storage tanks
- Classify the different types of storage facilities
- Explain the vapor recovery system from roof tanks and issues that can arise with floating roof tanks
- Classify the different types of atmospheric storage tanks and the potential types of fires that can arise from each type
- Identify the types of pressurized storage and the main issues associated with it
- Illustrate how loading trucks and rail cars are used to prevent loss of containment
- Identify the causes of pump release
- Classify and analyze the two main types of pumps and their issues
- Discuss mechanical single seals and tandem seals and explain their functions
- Identify the three main types of compressors and issues that can arise
- Identify the main types of fired heaters
- Discuss the issues that can occur with direct fired heaters
- Explain how furnace tube failure can occur
- Compare firetube and furnace fired heaters in regard to ignition and explosion
- Identify the main types of heat exchangers and issues that can arise
- Identify types of equipment within pressure vessels
- List and explain the causes of pressure vessel release

Relief and Flare Systems Core [PRS-RFS-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 56 min

In this skill module, you will learn about causes of overpressure, the different types of relief valves and their applications, depressurization, and flare systems.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Understand the typical causes of overpressure
- Identify the different types of relief devices and their applications
- Describe the purpose and operation of a depressurization system
- Identify major components of a flare system and describe their purpose

Historical Incident Databases, Plant Layout and Equipment Spacing Core [PRS-HID-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 45 min

This skill module deals with Historical Incident Databases, Process Safety Metrics, and the layout of operating facilities at the Core level.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- Terminology related to historical incident databases (HIDs) and process safety metrics
- How process safety metrics are related to HIDs
- Why and how HIDs are used
- Findings from a few readily available HID sources, including Duguid and UKHSE
- Where site selection and layout fit into the normal design sequence
- The main safety considerations and other criteria in site selection and layout
- Application of industry spacing guidelines

SIS, Monitoring and Control Core [PRS-SIS-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 32 min

This skill module is comprised of two sections, Safety Instrumented Systems (SIS) and Monitoring and Control. Within this skill module, you will find multiple control method examples and the concepts of SIL and SIF, and a case study that highlights the module.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Define and explain process control
- Identify the process safety instrumentation goals
- Identify and discuss the methods of control
- Describe the elements of feedback, cascade, and feedforward control
- Explain control modes and the elements of alarm philosophy
- Discuss the application of SCADA, DCS, MVC, MIS
- Describe Safety Instrumented Systems
- Illustrate when and why Safety Instrumented systems are used with reference to some key aspects of IEC 61511/ISA S84
- Define Safe Integrated Levels (SIL) and its assessment
- Discuss the effects of Test Frequency on Risk Reduction and Safe Integrated Levels

Fire Protection Systems Core [PRS-FPS-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 20 min

In this skill module, you will learn about the main fire protection strategies, passive and active protection, fire water and foam applications, fireproofing materials, and the use of drainage, containment, and remote impounding in prevention and mitigation of fire and explosion.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- The intent of fire protection
- Passive fire protection options
- Active fire protection options
- Basic principles and applications of explosion protection systems

Gas, Oil, and Water Composition and Properties Core [PRS-GOW-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 36 min

This module identifies the typical compositions of gas, oil, and produced water and describes how to determine the physical and thermal properties using charts or simple correlations. Knowing compositions and how to estimate thermal and physical properties are essential to size, evaluate, and troubleshoot the required equipment for processing the fluids from the well to meet sales, transportation, or disposal specifications.

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 how to

- Practice the concept of relative density of a gas
- Practice the concept of relative density of a liquid
- Practice converting from standard gas volumetric flow to mass flow
- Practice converting liquid volumetric flow to mass flow
- Describe the concept of atomic mass, molecular mass, and the mol
- Identify the four main hydrocarbon groups
- Describe an Equation of State, its purpose and uses
- Describe the gas compressibility factor, and use it to calculate gas density
- Define the property “viscosity”, list applications where it is used, and describe correlations that can be used to predict its value
- List the methods available to estimate hydrocarbon liquid density
- Estimate the water content of sweet and sour natural gas
- Discuss the difference between an extended analysis and a standard gas chromatographic analysis
- Recognize the uncertainties involved with characterizing the C6+ components in a natural gas, condensate or crude oil stream, and describe the relationship of these factors with hydrocarbon liquid composition
- Identify the typical compositions of crude oil
- Describe the physical and thermal properties of crude oil that are most used in facilities work and describe how the properties are determined
- Identify the typical composition of brine water
- Describe the physical and thermal properties of brine water that are most used in facilities engineering work, and explain how these properties are determined

Oil-Water Separation Fundamentals [PRS-OWS-2]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 3 min

This skill This module describes the characteristics of three-phase separators and discusses the methods used for oil-water separation. The following key concepts are covered in this module:

- Emulsions
- Stokes’ Law
- Oil dehydrators
- Three-phase separation

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 how to

- Describe emulsions, how they form, and how they influence separator design
- Discuss how emulsions can be destabilized and eliminated
- Describe Stokes’ Law and explain the influence of its Key Parameters on the Oil-Water separation
- Estimate the settling velocity of water in three cases of Condensate, Heavy Oil, and Emulsion with different viscosity values
- Discuss how emulsions can be destabilized and eliminated to achieve the Basic Sediment and Water specifications
- Estimate the size of an oil dehydrator based on liquid-liquid separation criteria
- Describe separator applications and common types of 3-phase gas liquid-liquid separators
- List the sizing criteria for 2-phase and 3-phase separators
- Discuss the principles of gas-liquid-liquid separation and how they applied in separator design
- Compare the residence time and droplet settling methods and discuss their application

Oil Treating and Desalting Fundamentals [PRS-OTR-2]

Coming Soon	Core	~4 hrs

This skill module reviews the various types of oil treating equipment available and their applications, and the key issues associated with the oil treater systems. It also covers main desalting process configurations, i.e., process flow diagrams, major equipment, etc. This skill module covers the following topics:

- Oil Treating Overview
- Oil Treating Methods
  - Application of Heat
  - Chemical Demulsifiers
  - Retention Time
  - Electricity
  - Mechanical Devices

Designed for

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

Surface Sand Handling, Hydrates Inhibition, Wax, Asphaltenes, and Scale Fundamentals [PRS-WAS-2]

Coming Soon	Core	~4 hrs

This skill module reviews the typically employed sand control/ mitigation options, and the key issues associated with the oil desanders. It also discusses what wax, asphaltene, and scales are, the problems caused, and how to mitigate them will be described. This skill module covers the following topics:

- Sources of Sand and Typical Characteristics in Surface Production Facilities
- Problems Resulting from Sand Production
- Sand Detection Equipment Options and Applications
- Sand Control / Mitigation and Disposal Options
- Wax in Crude Oil Systems and Associated Operational Issues
- Asphaltenes in Crude Oil and Associated Operational Issues
- Scale and Scale Control Options in Oil Production Facilities

Designed for

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

Risk Analysis and Inherently Safer Design Fundamentals [PRS-RAI-2]

Released	Fundamentals	8 hrs 12 min

This skill module builds on risk analysis and inherently safer design from the Process Safety Risk Analysis and Inherently Safer Design Core skill module. It includes an in-depth look at each of the topics listed and two interactive sessions.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Select and apply common methods of risk analysis
- Identify opportunities for use of ISD at different stages of facility lifecycle

Prerequisite

- Process Hazards Analysis and Layers of Protection Analysis Core [PRS-PHA-1]

PHA Techniques and LOPA Fundamentals [PRS-PHA-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	8 hrs 5min

This skill module builds on Process Hazards Analysis techniques and Layers of Protection from the Core skill module. It includes an in-depth look at each of the topics listed and two interactive sessions.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Select appropriate PHA methods, including HAZOP and API 14C
- Identify suitable applications for LOPA

Prerequisite

- Process Safety Risk Analysis and Inherently Safer Design Core [PRS-PSR-1]

Leakage and Dispersion, Combustion Behavior, Sources of Ignition Fundamentals [PRS-LDC-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	7 hrs 8 min

This skill module extends the learning in the corresponding three Core skill modules to the Fundamental level, using a combination of exercises and readings with two interactive sessions.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- Estimation of hydrocarbon behavior on loss containment
- Identification of common ignition sources
- Estimation of hydrocarbon behavior following ignition

Prerequisites

- Leakage and Dispersion of Hydrocarbons Core [PRS-LDH-1]
- Combustion Behavior of Hydrocarbons Core [PRS-CBH-1]
- Sources of Ignition and Hazardous Area Classification Core [PRS-SIH-1]

HID and Metrics, Bad Actors (Specific Systems) Fundamentals [PRS-HID-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	5 hrs 47 min

This skill module extends the learning from the Core modules to the Fundamental level, using applications of the learning to an example facility as the primarily learning reinforcement tool. There are several short evaluations, and two interactive sessions to discuss the applications developed by course participants.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn

- Applications of HID
- Criteria for sizing flare headers
- Identify potential process safety incidents at the example facility by considering specific systems and equipment (Bad Actors)

Prerequisites

- Historical Incident Databases, Plant Layout and Equipment Spacing Core [PRS-HID-1]
- Specific Plant Systems and Equipment Core [PRS-SPS-1]

Relief, Flare, and Depressurization Fundamentals [PRS-RFD-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	6 hrs 18 min

This skill module extends the learning from the corresponding Core module to the Fundamental level. There are quantitative and non-quantitative exercises, and proposed applications at the example facility. There will be two interactive sessions that will include discussions of applications developed by the course participants.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Size a relief valve for vapor service
- Size a relief valve for liquid service
- Describe how to calculate the relief load due to full bore failure of a heat exchanger tube
- Calculate inbreathing and outbreathing for atmospheric tanks
- Identify the key sizing parameters for flare headers and depressuring systems

Prerequisite

- Relief and Flare Systems Core [PRS-RFS-1]

Controls and Safety Instrumented Systems Fundamentals [PRS-CSI-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	5 hrs 21 min

This skill module extends the learning from the SIS, Monitoring, and Control Core module. There will be some sizing calculations and discussion of common instrumentation and types of control valves, with their advantages and disadvantages. Learning will be applied to the example facility. There will be two interactive sessions with discussion of applications chosen by course participants.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Explain control valve sizing and selection for some common applications
- Explain the advantages, disadvantages, and typical applications of commonly used instrumentation
- Explain the application of commonly used process control techniques
- Explain how a Safety Instrumented System (Emergency Shutdown System) is applied in facility design, using the logic which was introduced in the Core module
- Apply the learning to the example facility

Prerequisite

- SIS, Monitoring and Control Core [PRS-SIS-1]

Spacing and Layout, Fire Protection Fundamentals [PRS-SLF-2]

STATUS	LEVEL	DURATION
Released	Fundamentals	4 hrs 45 min

This skill module extends the learning from the Historical Incident Databases, Plant Layout and Equipment Spacing Core and Fire Protection Systems Core skill modules to the Fundamental level. Specific exercises will reinforce learning of the principles and will apply them to the example facility. There will be two interactive sessions in which those applications will be reviewed. Additional material will discuss some of the more complex fire and explosion control situations which may exist in downstream facilities.

Designed for

Facilities/process engineers, as well as engineers and operations staff involved in process safety and asset integrity.

You will learn how to

- Explain the logic of facility and process area layout
- Explain the reasons for selection of a fire prevention philosophy
- Explain how the selected fire control facility can be implemented
  Illustrate those learnings using the example facility

Prerequisites

- Historical Incident Databases, Plant Layout and Equipment Spacing Core [PRS-HID-1]
- Fire Protection Systems Core [PRS-FPS-1]

Mechanical Equipment Core [MEC-MEC-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 15 min

This skill module describes the principles and application of thermodynamic work and energy, primarily the principles of dynamic response, the structural and foundation concepts and its impact on equipment performance, and the cause and effect of different types of vibrations.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Define the terms “system” and “surroundings” and explain the difference between open and closed systems
- State the first law of thermodynamics, and how it is applied to facilities
- Describe the second law of thermodynamics and explain how it applies to facilities
- Write the energy balance equations for a heat exchanger, valve, separator, and compressor
- List the various types of foundations
- List the determining factors during foundation selection
- Describe the importance of equipment leveling
- Define offset alignment, rotational alignment, and soft foot
- Discuss the process of grouting and potential issues
- List alignment guidelines
- List piping installation and support considerations
- Describe the concepts of equipment condition monitoring, and performance analysis of rotating equipment
- List the parameters typically monitored for pumps and compressors
- Outline the concepts of trend analysis, set-points, and limit ranges
- Describe typical devices used to monitor rotating equipment
- Describe how to collect accurate, usable vibration data
- Identify the causes and effects of machinery vibrations in pumps and compressors
- Define the techniques typically used to mitigate vibration
- Define the basic principles of centrifugal action in kinetic pumps and compressors
- Describe how these principles lead to the machine performance
- Describe how these principles affect the efficiency of the machine
- Describe the basic approach to characterizing a pumping/ compression system
- Define the system curve and describe how to develop it
- Determine the operating point of the system and the pump/ compressor
- Describe how to use pump/compressor selection charts for the selection of the proper pump/compressor type

Properties of Materials Core [MEC-PMC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 23 min

With time, significant improvements have been made to metal compositions to ensure increased safety, operability, and reliability of the finished product in the field. These improvements have been documented in standards such as American Society of Mechanical Engineers (ASME). Knowledge of these standards is crucial to understanding design and fabrication specifications. This skill module provides an overview of the standards that impact the design and fabrication of pressure vessels.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Recognize the basic materials used in pressure vessels
- Define what materials are acceptable and which are not for vessels as compared with piping
- Compare the chemical and physical characteristics of plates, forgings, and piping materials
- Name the most common steel making process for fine grain pressure vessel steel
- Describe the difference between “as rolled” and normalized plate grain structure
- Discuss the iron carbon phase diagram
- Discuss the characteristics of Austenitic Stainless and Martensitic Stainless Steels
- Identify uses of Austenitic Stainless in low temperature applications
- Discuss uses of Martensitic Stainless
- Describe an overview of Duplex Stainless materials
- Discuss Low Alloy Chrome Moly materials for high temperature applications
- Define the types of cladding
- Discuss the advantages of each type
- Review the steps necessary to produce a clad plate in each process

Unfired Pressure Vessels Core [MEC-UPV-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 55 min

This skill module explains the industry pressure vessel design and specifications, including the organizations that provide the applicable codes and standards.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities

You will learn how to

- Identify the purpose of the code
- Identify the sections of the Boilers and Pressure Vessels (B&PV) Code
- Learn the major components of Section VIII, Div. 1
- Differentiate between an ASME Section VIII, Div. 1 vessel and B31.3 piping
- List the bodies and regulations that govern pressure vessel design and operations
- Describe all design criteria items for pressure vessels
- Differentiate between design pressure, maximum allowable working pressure, and maximum allowable pressure
- Discuss design stress levels according to temperatures
- Differentiate between operating and design temperatures and pressures
- List the flange ratings and temperature
- Calculate wall thicknesses of shells, heads, and cones using the formulas from ASME Section VIII, Div. 1
- List corrosion allowances for process nozzles and minimum nozzle neck thicknesses
- State the differences in types of heat treatment
- Compare the results of each type of heat treatment
- Discuss requirements for Post Weld Heat Treatment, methods, and cooling procedures
- Explain the basics of corrosion including rust
- Determine corrosion allowance (CA) for general hydrocarbon use and natural gas service
- Identify the corrosive elements in hydrocarbon processing
- Discuss ways to combat corrosion
- Discuss the ramifications of vessel penetrations
- Identify the options available to remedy nozzle penetrations
- Examine the vacuum forces on pressure vessels
- Study the corrosion allowance chart in reference to nozzle sizes
- Discuss the rules for inspection openings and manways
- Identify the Records Retention requirements
- Examine the following vessel appurtenances:
  - Vessel internals, externals, and supports
  - Openings (other than process nozzles)
  - Externals
  - Vessel supports

Piping Systems and Welding Core [MEC-PSW-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 17 min

This skill module describes the material and construction methods and piping system codes, including industry requirements and principles related to piping system operation, safety, reliability, and availability outlining applicable codes/standards and statutory requirements. The module also explains the purpose of welding, codes, types of weld processes, welding metallurgy, filler materials, shield materials, testing practices, and quality control.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe the processes for manufacturing industrial pipe for high pressure and hazardous material containment
- Describe industry design, material, and construction methods
- Define piping specifications, economic selection criteria, and project specific requirements
- Identify pressure, temperature, and weight factors, and describe how they are applied to piping systems
- Define pipe sizing criteria and equations, outlining loads/limits
- Identify thermal and dynamic effects of pipe sizing and selection criteria
- Describe key code references applicable to piping sizing and selection criteria
- Describe piping sizes, ratings, materials, and design considerations
- Explain pipe and fitting manufacturing codes, standards, and industry specifications
- Identify piping materials for oil and gas and other industrial applications
- Describe and identify basic industry codes and standards that define piping classes, services, and service conditions used in the oil and gas and other industries
- Describe the physical properties of the fluid and the pipeline that affect liquid flow
- Define the application and importance of conservation of energy, conservation of mass to determining hydraulic behavior
- Determine flow friction coefficients and calculate proper line size/pressure drop relationship for hazardous liquids pipelines
- Describe the physical properties of the fluid and the pipeline that affect liquid flow
- Define the application and importance of conservation of energy, conservation of mass to determining hydraulic behavior
- Determine flow friction coefficients and calculate proper line size/pressure drop relationship for hazardous liquids pipelines
- Define issues related to piping system layout and integration with other equipment
- Describe joint efficiency and what it means
- Explain the difference between a joint efficiency of 1.0 and full radiography of all pressure containing butt welds
- Identify the 100% radiography requirements from chart UCS-57
- Describe weld joint design and preparation
- Discuss the five types of welding used in pressure vessels and their application
- Review common weld defects
- Explain the differences between Procedure Qualification Record (PQR) and Welding Performance Qualification (WPQ)

Fired Heaters and Boilers Core [MEC-FHB-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 1 min

This skill module describes the types of fired heaters used in oil and gas processing, their common applications and service conditions along with the organizations that provide codes and standards for fired heaters. In addition, the skill module discusses the design and operation of fired heaters, economic selection criteria, typical pressure-temperature ratings, materials of construction and limitations. The skill module finishes discussion with types of boilers, applicable service conditions, materials of construction and limitations for boilers and water quality considerations.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe the types of fired heaters used in oil and gas processing, most common applications, and service conditions
- Identify organizations that provide codes and standards for fired heaters
- Describe major code requirements that affect design, material selection, inspection, and safe practices
- Describe design and operation of fired heaters, economic selection criteria, typical pressure-temperature ratings, materials of construction, and limitations
- Describe types of burners, applicable service conditions, construction materials, and limitations
- Describe how NOx emissions are monitored and controlled
- Describe the purpose of coatings, linings, and heat insulation
- Identify basic types of boilers, applicable service conditions, materials of construction and limitations for boilers, and water quality considerations
- Describe the corrosion processes and protection requirements

Storage Tanks Core [MEC-STC-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 32 min

This skill module describes storage tanks used to store liquid or liquefied commodities. Key concepts for storage tanks explained in the skill module include:

- Types and their limitations
- Factors influencing basic engineering design, material selection, fabrication, inspection and testing, operation, and safe practices
- Environmental and safety considerations
- Industry codes and standards

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe a high level classification of types of storage tanks used to store liquid or liquefied commodities
- Describe the types of storage facilities and the products that can be stored in each
- Identify industry codes and standards that cover different tank types
- Identify terminals as intermodal and logistics nodes
- Describe the classification of types of storage tanks
- Describe the factors that distinguish storage tanks
- Describe the selection process of storage tanks
- Identify economic factors used to size and select storage tanks
- Describe the factors that influence the design, construction, operation, and maintenance of above ground (AST) and underground storage tanks (UST)
- Explain environmental and safety considerations and containment requirements for ASTs and USTs
- Describe process facilities and how they affect storage tanks
- Identify basic pressure limitations, contained fluids, venting requirements, maximum / minimum operating pressures and temperatures, and materials of construction that determine tank service conditions
- Identify typical products or product contaminants that can cause loss of structural or operational integrity of storage tanks
- Identify organizations that develop and provide codes and standards for the design and construction of storage tanks
- Describe the code requirements that affect the basic engineering design, material selection, fabrication, inspection and testing, operation, and safe practices of storage tanks
- Identify codes that govern field-welded, shop-welded bolted atmospheric, and low-pressure storage tanks

Corrosion Control and Protection Core [MEC-CCC-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 30 min

This skill module covers the main causes of corrosion in upstream oil and gas operations, as well as monitoring and mitigation methods. The various corrosion mechanisms give rise to a number of different forms of corrosion damage, which will be reviewed. Participants will be introduced to the design principles of simple cathodic protection systems and the basics of utilizing corrosion inhibitors.

Designed for

Managers, engineers, chemists, and operators who need to understand corrosion and its control management in oil and gas production and processing.

You will learn how to

- Define corrosion
- List the different forms of corrosion
- Describe the likely effects of corrosion on safety, environment, and business issues
- Describe the basic aspects of electrochemical corrosion
- Describe the four necessary elements to form an electrochemical corrosion cell
- Identify the different forms of corrosion encountered in oil and gas facilities
- Define the basic corrosion principles which apply to cathodic protection
- Describe the galvanic series of metals and its significance
- Identify methods of corrosion control
- Recognize the use of coatings, corrosion inhibitors, biocides and cleaning pigs and scrapers as forms of corrosion protection

Reciprocating Engines, Electric Motor Drivers and Generators Core [MEC-REE-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 4 min

This skill module describes the basic types of reciprocating engines, including key operational aspects, characteristics, performance, design, fuel and aspiration systems, codes and standards, testing and sizing for engines used as prime movers/drivers in oil and gas applications. The skill module also explains electric motor drivers including electric power generation fundamentals, basic AC motor types used in oil and gas, selection criteria, efficiency and performance standards, mechanical and electrical design aspects, typical accessories, motor starting techniques, and typical maintenance, inspection and commissioning activities.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe the basic types of reciprocating engines
- List key performance criteria
- Outline the sizing process for reciprocating engines
- Describe the contents of project mechanical specifications typical for reciprocating engines
- Describe the types of fuels and the type of aspiration systems used in reciprocating engines
- List applicable company/industry codes and standards for reciprocating engines
- Describe systems for starting, lubricating oil, and cooling water
- Describe the inspection and testing of reciprocating engine emissions and performance
- Describe maintenance and repair techniques
- Explain the fundamental principles of power generation and AC power supplies
- Describe a motor driver and its key operational aspects
- Describe differences in operation between induction and synchronous motors and how to select between them
- Identify key design and operating parameters of electric motors
- Identify electric motor de-rating factors
- Describe the relationship between motor torque and speed
- List available motor accessories and their functions
- Describe the typical data shown on motor nameplate
- Describe the methods of motor starting and their pros/cons
- Describe operation of variable speed drives and their effects on electrical equipment
- Describe items generally covered in optional Factory Acceptance Testing
- Describe common steps in commissioning motors
- List typical motor maintenance activities and typical failure modes

Gas and Steam Turbines Core [MEC-GST-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 46 min

This skill module describes the basic types of gas and steam turbine engines used as prime movers / drivers in oil and gas applications and explains their key components, sizing, standards and specifications, and control systems.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe how a gas turbine works
- Identify the types of gas turbines, major components, and common applications
- Describe the main factors that affect gas turbine performance
- List the options for heat recovery from gas turbines
- Explain the differences in the design and application of heat recovery from gas turbines
- Describe inlet air filtration systems and air-cooling options
- List common fuel gas specifications for natural gas
- List common pollutants in exhaust emissions and describe their mitigation methods
- Describe gas turbine control systems
- List common steam turbine applications as prime movers in oil and gas facilities
- Describe the types of steam turbines used, key mechanical components, and auxiliary systems
- List applicable company standards and industry codes for steam turbine driven equipment
- Describe types of rotors used and differences in their performance
- Describe the relationship between power output, steam inlet, and exhaust conditions and how this impacts facility design and operation
- Describe common steam turbine control strategies
- List typical steam turbine damage mechanisms and maintenance and repair techniques
- Outline the key steps in supplier selection and materials sourcing
- Describe procedures for over-speed testing

Mechanical Equipment Inspection, Operation and Maintenance Core [MEC-MEI-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs

This skill module describes the key considerations, specifications, and codes and standards for inspection, operation, and maintenance of non-rotating equipment.

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Define the type of equipment that constitute Non-Rotating Equipment (N-RE)
- Outline the common processes of startup and shutdown of Non-Rotating Equipment (N-RE)
- List common problems that occur during startup and shutdown that can affect equipment integrity
- Describe operating N-RE as units and part of a station
- Describe operational processes and their shutdown parameters that control unit and station operation
- Describe the basic activities and functions of SCADA systems for N-RE systems
- List routine maintenance activities for N-RE in oil and gas facilities
- Define concepts of inspection, routine maintenance, preventive maintenance, repairs and planned major overhauls
- List considerations for sparing of N-RE in oil and gas facilities
- Describe the concepts of stand-by units, spare units and spare capacity
- Describe the process of inspection planning for N-RE
- List the inspection techniques used on N-RE
- Describe RBI and identify associated codes and standards
- List the principal safety issues with N-RE
- Define concepts of equipment reliability and availability related to N-RE
- Describe the concept of risk when applied to N-RE

Machinery Design, Materials and Subsystems Core [MEC-MDM-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 35 min

This skill module describes the principal materials used for the components for major types of rotating equipment. It also explains how each of the following are used with major types of rotating equipment along with applicable standards and codes:

- Gears
- Transmission systems
- Couplings
- Seals
- Lubrication and filtration systems

Designed for

Facilities Engineers, Process Engineers, Senior Operations Personnel, Field Supervisors, Engineers who select, design, install, evaluate or operate gas processing plants and related facilities.

You will learn how to

- Describe the principal materials used for the components for each major type of rotating equipment
- Outline the criteria that are used in the selection of these materials
- List how materials can affect operations and maintenance
- List applicable codes and standards for materials related to rotating machinery
- Describe the gearing, transmission systems used with the major types of rotating equipment
- Describe how couplings transmit power and explain the difference between a rigid and a flexible coupling and under which circumstances each is used
- Outline the functions of gearing and coupling systems and the principal design factors for each system
- Identify the key properties of lubricating oil that are special to gearing systems
- List the failure modes typically encountered in gear and coupling systems and how to identify them before they become failures
- List the key operational and maintenance considerations of gearing and coupling systems
- Describe the key material and manufacturing considerations
- List the related industry codes and standards
- List seal types, categories and the advantages and disadvantages of each
- List the failure mechanisms typically encountered with sealing systems
- Explain the purpose of seal flush plans for pumps
- Describe the key mechanical and operational differences between mechanical contact seals and dry gas seals
- List the codes and standards used for seals in the energy industry
- List the various types of bearings, describe the principles of lubrication for the different bearing types and list under what conditions they would be used
- Describe why rolling element bearings have a finite life
- Describe the principles of operation of tilting pad bearings and of magnetic bearings
- Show how to calculate clearances for hydrodynamic sleeve and tilting pad bearings
- Describe the fitting procedure for each type of bearing and how those procedures are affected by mechanical clearances
- List the failure mechanisms typically encountered with bearings, how to identify them and how to prevent them
- Describe the lubrication and filtration systems used with the major types of rotating equipment
- Outline the functions of lubrication and filtration systems and the principal design factors for each system and the major component
- List the types of lubricants used for rotating equipment and the properties and limitations of each
- List the key operational and maintenance considerations of lubrication systems
- List the effects of lubricant deterioration on the health of rotating equipment, how these effects may be identified before damage occurs and how damage may be prevented
- Describe the key material and manufacturing considerations
- List the related industry codes and standards

Control Systems for Oil and Gas Applications Core (Part 1) [INC-CS1-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs

This skill module provides an introduction and overview of control systems typically encountered in the oil and gas facilities.

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 IC&E systems.

You will learn how to

- Describe the relationship between current, voltage, and resistance
- Differentiate between self-powered and loop-powered devices
- Explain the nature of backup AC and DC power
- Describe what is control, types of control, and its purpose and architecture
- Identify the nature of analog and digital input and output signals
- Describe signals, the use of pneumatic actuators and control systems, and managing noise
- Identify various signal converters and types of wiring and cabling
- Describe instrument tag numbers, PID symbols, and documentation

Control Systems for Oil and Gas Applications Core (Part 2) [INC-CS2-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 16 min

This skill module provides an overview of safety instrumented systems and their applications in the oil and gas facilities. The focus is to understand terminology, concepts, and common pitfalls in order to improve communication with electrical and I&C professionals.

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

You will learn how to

- Explain Safety Instrumented System (SIS) and their uses
- Recognize the importance of identifying risks and hazards, and conducting assessments and analysis to address them
- Differentiate between BPCS and SIS
- Recognize the importance of SIL 1 to SIL 4 classifications
- Describe the SIS lifecycle
- Identify the need for product and application diagnostics
- Define management of change (MoC)
- Identify the need for a safety requirement specification
- Identify the purpose of an uninterruptible power supply (UPS)

Instrumentation Selection for Oil and Gas Applications Core (General) [INC-ISO-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs

This skill module introduces the learner to the field of instrumentation and control in the oil and gas industry.

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

You will learn how to

- Identify fluid properties as they relate to instruments selection in the oil and gas industry
- Describe the material selection criteria in instrument selection
- Gain guidance on some of the material compatibility requirements within the industry
- Discuss the operation of switches, relays and solenoids
- Describe the basic principles underlying the 4-20 mA instrument signal control loop
- Describe typical instrumentation documentation
- Describe the three main types of instrument connections

Instrumentation Selection for Oil and Gas Applications Core (Flow) [INC-ISF-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 57 min

In this module we discuss various types of flow meters, including their technology, components, features, use, and technology in the oil and gas industry.

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 IC&E systems.

You will learn how to

- Review the basics of flow profiles
- Discuss the different technologies used for flow switches
- Identify the working principle, and advantages and disadvantages of the following positive displacement meters
- Identify the working principle, advantages, and disadvantages of the following head loss meter technologies
- Describe the basic working principle of a turbine meter
- Explain Faraday's law and how this may be applied to the measuring liquid flow
- Describe the working principle of Doppler-based meters
- Review the working principle of transit-time meters
- Explain the working principles of clamp-on meters
- Review some of the tube arrangements used in Coriolis measurement
- Describe the phenomenon of vortex shedding and the formation of vortices
- Explain how the Strouhal factor varies with the bluff body shape and Reynolds number
- Describe the working principle of a typical vortex meter
- Discuss the role of a three-phase separator
- Identify the need for multiphase flow metering (MPFM)
- Explain the differences between calibration, verification, proving, and validation
- Discuss some of the on-site open and closed tank prover systems
- Explain the working principle of a bidirectional pipe prover
- Describe the working principle of eight unidirectional pipe prover
- Review the use and working principle of piston provers
- Describe the role of a LACT system
- Discuss the role of environmental influences
- Identify some common selection criteria

Instrumentation Selection for Oil and Gas Applications Core (Level) [INC-ISL-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 4 min

This skill module explains the reason for measuring level and the various technologies available to measure level.

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 IC&E systems.

You will learn how to

- Review basic reasons for measuring level
- Discuss the pros and cons of using a bridle
- Explain the basic functions of a stilling well
- Describe how a simple sight glass is used to monitor the level
- Review how float systems can provide direct reading outputs
- Examine the use of hydrostatic pressure measurement in an open tank level measurement
- Describe the use of electronic remote diaphragm seals
- Discuss the working principle of ultrasonic gap point level meter
- Examine the working principles of conventional pulse radar
- Describe a simple laser-based level measuring system
- Examine the working principle of a Geiger Muller tube
- Explain principle of tank strapping

Instrumentation Selection for Oil and Gas Applications Core (Pressure, Temperature) – [INC-ISP-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 25 min

This module focuses on temperature and pressure devices that are critical in detecting and preventing abnormal conditions, which may result in a loss of containment and/or safety events.

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

You will learn how to

- Review the fundamental principles of temperature measurement
- Describe the correct application and installation of RTDs, thermocouples, and thermistors
- Describe the requirements for specifying thermowells
- Review the basics of radiation thermometry
- Describe the working principles of the main types of mechanical pressure measurement and their applications
- Describe the features of multi variable pressure transmitters

Instrumentation Selection for Oil and Gas Applications Core (Analysis) [INC-ISA-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 23 min

This module focuses on an analysis of the composition of the oil and gas product. Analysis of process streams is common in many industries and can be performed using numerous methods, some of which are covered in this module.

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 IC&E systems.

You will learn how to

- Describe the basic elements of an analysis system
- Review the need for basic sediment and water (BS&W) measurement
- Explain the need to measure pH in the oil and gas industry
- Describe the basis of Thin Layer Chromatography (TLC)
- Describe the basis of colorimetry
- Describe the working principle of UV fluorescence
- Select an instrument suitable to measure H2S in a gas stream
- Describe the technologies available for oxygen measurement

Control Valves for Oil and Gas Applications Core [INC-CVO-1]

STATUS	LEVEL	DURATION
Released	Core	7 hrs 4 min

This skill module provides an overview of the control valves and actuation devices commonly used in oil and gas operations. The focus is to understand terminology, concepts, typical equipment configurations, and common pitfalls in order to make proper selection that is fit for application.

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 IC&E systems.

You will learn how to

- Provide an overview of valve construction
- Briefly discuss the various methods of valve actuation
- Discuss the relevance of the vena contracta
- Compare the difference between flashing and cavitation
- Describe the various types of control valves
- Describe the various types of actuation devices
- Provide a basic overview of pressure regulators and their applications

NEC-Based Electrical Design, Installation and Safety Codes Core [ELE-EDI-1]

STATUS	LEVEL	DURATION
Released	Core	5 hrs 18 min

This skill module is designed to give learners a jump-start in learning how to navigate and apply the National Electrical Code, NFPA 70 for oil and gas installations. Various sections of the code are discussed as they relate to oil and gas facilities. Though not required, learners will get a richer experience if they can obtain a copy of the National Electrical Code, NFPA 70 to review in conjunction with this module.

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of electrical systems within oil and gas facilities.

You will learn how to

- Describe the need for codes and regulations in the oil and gas industry
- Describe the role of OSHA and enforcement mechanisms for common industry recognized codes and standards
- Identify Codes and Standards used for Sizing, Specification and Installation of Electrical Equipment and infrastructure for Oil and Gas Facilities
- Identify Codes and Standards used for determining the degree and extent of hazardous (explosive) areas in Oil and Gas Facilities
- Describe the purpose and scope of the NEC
- Describe the role of circuit breakers, fuses and overload relays and the code sections that reference their sizing
- Describe the scope, purpose and history of NPFA 70B

Principles of Power Systems in Oil and Gas Applications Core (Part 1) [ELE-PR1-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 24 min

This skill module is the first of two skill modules intended for those with little or no background in electrical theory or the practical application of those principles to power systems in typical oil and gas or industrial facilities. We strongly encourage taking both skill modules.

The skill module avoids the typical academic approach and instead focuses on explaining complex concepts using easy-to-understand analogies. These analogies are then immediately extended to describe how the concepts are used in the design of industrial power systems. Once the basic equipment principles are described, examples are given of how they are applied to affect the safety, reliability, efficiency and cost of power systems.

By the end of these two modules, the learner should be able to interpret the basic elements of simple one-line diagrams, identify the equipment voltage, power, and current ratings, relate them to the physical equipment installed and understand facility power consumption and energy cost factors.

This skill module covers the following topics:

- Basics of Electricity
- Generating Electricity

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

You will learn how to

- Describe electricity and its role in energy
- Explain the general structure of a power system
- Describe the roles and materials used for conductors, insulators and semiconductors
- Describe how magnetic fields and electric fields are related
- Define the common electrical properties of Voltage, Current, Resistance, and Power
- Describe how these properties impact electrical equipment design such as conductors, transformers, motors, and generators
- Describe a basic AC and DC electrical circuit and its components
- Use Ohm’s Watt’s and Kirchhoff’s Laws to solve basic electrical problems
- Describe how basic series and parallel circuits behave and how they are wired
- List the ways in which Voltage can be produced
- Describe how static electricity is generated and the hazards associated
- Explain equipment power ratings for power sources and consumers
- Define power system efficiency and its effects
- Describe the power requirements of typical power source and distribution equipment
- Define power usage and demand and their impact on electricity costs
- Differentiate DC and AC power systems, and their typical applications
- Describe how AC power is generated using rotating equipment
- Describe the basic characteristics of AC power including sine waves, frequency, and RMS values
- Describe the function of Inductors, Capacitors and their impact on Reactance and Impedance
- Describe Power Factor, its causes, and impact on power system
- List the basic equations used in DC and AC circuits

Principles of Power Systems in Oil and Gas Applications Core (Part 2) [ELE-PR2-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 42 min

This skill module is the second of two skill modules intended for those with little or no background in electrical theory or the practical application of those principles to power systems in typical oil and gas or industrial facilities. We strongly encourage taking Principles of Power Systems in Oil and Gas Applications Core (Part 1) prior to this skill module.

The skill module avoids the typical academic approach and instead focuses on explaining complex concepts using easy-to-understand analogies. These analogies are then immediately extended to describe how the concepts are used in the design of industrial power systems. Once the basic equipment principles are described, examples are given of how they are applied to affect the safety, reliability, efficiency, and cost of power systems.

By the end of these two modules, the learner should be able to interpret the basic elements of simple one-line diagrams, identify the equipment voltage, power, and current ratings, relate them to the physical equipment installed and understand facility power consumption and energy cost factors.

This skill module covers the following topics:

- Three-Phase Power Systems and Harmonics
- Conductor Design
- Overview of Industrial Power Distribution Systems
- Grounding (Earthing) and Bonding

Designed for

Facilities and Project Engineers as well as newly graduated Electrical, Controls and Instrument Engineers (0-5 years) with a need to improve basic understanding of instrumentation and control systems within oil and gas facilities.

You will learn how to

- Describe 3-phase power systems, their characteristics, applications, and advantages
- List the basic equations used for DC, AC single phase, and 3-phase power systems
- Describe Harmonics, their sources, and their impact on power systems
- Explain the basics of conductor construction, selection, and sizing
- List the factors influencing system voltage selection and the implications
- Describe the materials used and basic properties of insulating materials used in cable systems
- Describe the differences between aluminum and copper conductors, and the advantages/disadvantages of each
- Describe how conductor cross-sectional area is measured around the world and its relation to cable sizing
- Summarize the relationship between conductor current carrying capacity, cross-sectional area, insulation design, ambient conditions, and installation methods
- Explain how heat management is related to electrical system design and influences equipment design such as conductors, transformers, motors, and generators
- Describe the causes and issues associated with voltage drop, and the typical design limits used
- Describe the basic components and function of a power transformer
- Describe the role of power distribution equipment, typical construction, and common types used in industrial power systems
- Describe a typical power distribution system in an oil and gas facility, the equipment used, and the purpose of each
- Interpret a single-line diagram
- Define Reliability and Availability targets, and the impact on power system design
- Describe the basic purpose of grounding and bonding systems
- Differentiate between an equipment grounding conductor and a grounded (neutral) conductor
- Describe the hazards associated with Touch and Step potential and how bonding and grounding reduce the risks
- Describe the components used in grounding and bonding systems and their basic characteristics
- Describe the performance measures for grounding and bonding systems
- Describe the grounding and bonding issues associated with control systems
- Explain how independent bonding and grounding of separate systems are connected

Pipeline O&M, Leak Detection, Repairs, Alterations and Abandonment Core [PIP-POM-1]

STATUS	LEVEL	DURATION
Released	Core	3 hrs 24 min

In this skill module, you will learn the key aspects of daily operations and maintenance of pipeline systems. You will recognize the reasons for monitoring pipelines, how to detect leaks, and common systems that are used for leak detection. Also covered in this module, key actions and components of pipeline emergency response programs, and primary methods to debottleneck a pipeline system. You will learn about the code requirements for asset integrity management, primary onshore and offshore pipeline repair methods, and the general principles behind SIMOPS procedures. Lastly, you will learn about the issues that must be addressed when reactivating an idled pipeline and the requirements to correctly abandon a pipeline.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn how to

- Describe the risks and consequences of pipeline incidents by type of service and location
- Define High Consequence Area [HCA] and list the impacts on pipeline design and operation
- List the primary pipeline defects and the required repair methods for each
- List the specialized materials, supplies, and equipment that may be required for emergency repairs
- Explain the variety of definitions for decommissioning, idling, and abandoning pipeline facilities

Pipeline Routing and Geomatics Core [PIP-PRG-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 5 min

In this skill module, you will be exposed to the basic terminology, concepts and methods associated with defining a specific location on earth as part of the description of a pipeline route/alignment. This includes basic requirements for surveying, use of advanced techniques like global positioning systems (GPS), remote sensing imagery, and techniques for subsea surveying (bathymetry) applicable for offshore pipelines. The module further covers key considerations for pipeline route selection and exclusion zones, as well as the impact population density may have on the design of a pipeline.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn how to

- Define monument, benchmark, longitude and latitude
- Define basic requirements of surveying and describe how points on the earth are uniquely defined relative to the rest of the world
- Define how global positioning systems (GPS) and remotely sensed imagery have modernized surveying techniques over the last 20 years
- Describe methods and inherent difficulties for subsea surveying
- Describe the basic surveys required for pipeline design, construction, and operations
- Describe the impact of geographic information systems (GIS) on pipeline surveys, drawings, and maps
- Describe the functionality of Web / internet resources (such as Earth/Map) for the pipeline engineer and operator
- Describe the critical issues in routing a pipeline
- Compile a list of critical route selection criteria, and identify potential “fatal flaw” situations including:
    - Public safety aspects of pipeline construction, operations, and maintenance
    - Environmental considerations of pipeline construction, operations and maintenance
- Describe the role GIS plays incurred pipeline route selection and how Web / internet resources can assist
- Describe advantages/disadvantages of using existing corridors
- Define the why population/occupied building density must be consider in pipeline routing

Compliance and Pollution Events and Environmental Impacts and Assessments Core (U.S. Focus) [PIP-CPE-1]

STATUS	LEVEL	DURATION
Released	Core	2 hrs 15 min

In this skill module, you will learn the US legislation, regulations, and compliance requirements for pipelines. Also discussed are environmental impacts statements and assessment.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn how to

- Explain the background of US environmental legislation, especially the National Environmental Policy Act, and similar legislation around the world
- Describe some of the history and politics behind the creation of environmental policy
- Compare and contrast US environmental policy and legislation with that of other energy producing nations
- Explain how US environmental legislation is implemented by regulating agencies
- Describe the major aspects of environmental assessments and environmental impact studies
- Describe the impact of environmental protection laws on pipeline design, permitting, construction, and operations
- Describe the process in producing an EIS – Environmental Impact Statement in compliance with NEPA
- Describe from historic cases studies how:
    - Accidents and incidents drive development of codes and regulations in the pipeline business
    - Role of media reporting and public perception of incidents may drive responses both short and long term
    - Events affect the general public, the operator, the industry and regulators
    - Being a linear facility often of considerable length and in multiple jurisdictions, renders control of pipeline facilities more difficult
    - Transparent and exposed pipeline activities are subject to public scrutiny

Pipeline Hydraulics and Flow Assurance Core [PIP-PHF-1

STATUS	LEVEL	DURATION
Released	Core	3 hrs 2 min

This skill module explains the physical properties and fluid flow characteristics of hydrocarbon gas and liquids. Topics also covered are friction flow, volumetric flow, multiphase flow, and flow assurance considerations for pipeline systems.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn

- Describe the physical properties and fluid flow characteristics of hydrocarbon gas and liquid
- Apply volumetric flow equations for natural gas & liquid flows
- Define the key parameters for pump station locations based on hydraulic profile & compressor station locations
- Describe the impact of system pressure on volumetric flow rate, diameter, friction losses, and compression power in gas pipelines
- Describe multiphase flow characteristics
- Describe the importance of temperature management, uses of insulation, and the challenges of design, installation and operation of insulation / heat tracing systems
- Describe the fluid characteristics, flow assurance issue and methods to manage for Hydrates, Wax / Paraffinic Fluids, Multiphase Flow, Scale

Pipeline Strength, Stability and Environmental Considerations Core [PIP-PSS-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 40 min

This skill module explains the strength, stability, and environmental considerations in building and operating pipelines on land and in the sea. Topics covered include longitudinal stress, pipelay operations, thermal and pressure effects, and hydrodynamic and soil resistance.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn

- Describe the similarities and differences between the ASME 31.4, ASME B31.8, and ISO 13623 with respect to calculating and determining acceptance of pressure related stresses
- Define the contributing factors for longitudinal stress and where these would likely occur based on Pressure, Bending, Axial Loads, Thermal/Pressure Expansion
- Describe the stresses occurring during offshore pipelay operations and the differences and similarities in between S-Lay, J-Lay, and Reel Lay
- Define and describe application of Tie-in/installation temperature, Ground temperature, Pressure end effects, Soil/Support Frictional Resistance
- Describe the hydrodynamic and soil resistance model for pipeline stability
- Define the differences between, Point and Body stability, Static stability Dynamic stability
- Define the issues for pipe stability and integrity when in a free (unsupported) span in water and in air

Pipeline Pump and Compressor Stations and Terminals Core [PIP-PCS-1]

STATUS	LEVEL	DURATION
Released	Core	1 hr 36 min

In this skill module, you will learn the important role played by pumps and compressors in transporting hydrocarbons in pipelines. The module also covers meter stations, launcher and receiver stations, storage facilities, and valve stations.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn

- Describe the equipment and facilities that constitute, along with the pipeline, a pipeline system, including:
  - Pump and compressor stations
  - Storage
  - Metering
  - Launchers and receivers
  - Valve stations
  - Utilities
- List facilities/components that would typically be found in:
  - Field gathering systems, field injection systems, Crude oil systems, Natural gas systems
  - Refined product systems, NGL products systems, distribution systems

Pipeline Construction Core [PIP-PIC-1]

STATUS	LEVEL	DURATION
Released	Core	4 hrs 19 min

In this skill module, you will learn a brief history of pipelines and the Company and Contractors' responsibilities during pipeline construction. Also discussed are key onshore and offshore construction activities.

Designed for

Engineers or Facilities Engineers involved in design, operation, maintenance or construction of pipelines or pipeline facilities.

You will learn

- Describe the Company and Contractor responsibilities during the construction phase onshore pipelines in the US
- Describe the options for contracting the major pipeline projects onshore and the factors that determine which method is used
- Describe the key activities during onshore pipeline construction
- Describe the major tasks during each major construction activity
- Describe the key activities during onshore pipeline construction
- Describe the major tasks during each major construction activity
- Describe the Company and Contractor responsibilities during the construction phase offshore pipelines
- Describe the options for constructing offshore pipeline projects and the factors that determine method used
- Describe the key activities and major tasks during offshore pipeline construction
- Define the challenges and solutions for shore crossings, including Horizontal Directional Drilling, and riser installations

The Drivers Behind Net-Zero Core [GRN-DBN-1-N]

STATUS	LEVEL	DURATION
Released	Core	1 hr 36 min

This skill module covers the following topics:

- Global warming – the case for and against
- Greenhouse gases – what are they and what do they do?
- Paris Accord / International Energy Agency / Intergovernmental Panel on Climate Change
- Environmental, Social, and Governance Risks (ESG)

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn

- Define the terms "Climate Change" and "Global Warming"
- Explain the history of global temperature and carbon dioxide levels
- Describe the difference between 20 year and 100 year global warming effects
- Identify who are the authorities and governmental agencies
- Describe the effect of greenhouse emissions and associated risks to the environment

Business Aspects of Global Warming and Alternative Energies [MUL-BAR-1-B]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

This skill module covers the following topics:

- How big is big – how much hydrocarbon usage do we need to displace?
- Carbon net zero
- Energy costs
- Life Cycle Assessment

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Quantify the effects of global warming and the predicted infrastructure requirements
- Describe how global business is affected by climate change policies
- Describe the Life Cycle Assessment process

Existing Power Generation Technologies with Alternative Energies Core [MUL-EPG-1-B]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

This skill module covers the following topics:

- Coal, Oil, Gas
  - Traditional Power Generation
  - Integrated Gas Turbine Combined Cycle
- Hydroelectric
  - Nuclear Power Generation
  - Generation I, II, III, IV
- Nuclear Safety
- Geothermal
- Ocean
  - Mechanical
  - Thermal

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Be able to discuss the practical usage of Solar Power technologies in industrial and domestic application
- List the various power production alternatives
- Describe traditional power generation techniques
- Describe turbines and boilers
- Describe waste heat recovery processes

Carbon Capture, Utilization, and Storage Core [CCA-CCU-1-N]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

This skill module provides a 30,000-foot view of the emerging field of CO_2 capture from stationary industrial emissions sources – primarily combustion operations. CO_2 capture is part of the so-called "CCUS" chain – CO_2 Capture, Utilization, and Storage – wherein CO_2 is prevented from entering the atmosphere by removing it from flue gas or other vent streams, transported to an appropriate location, and injected deep underground into secure geologic formations or utilized.

The content parallels the information covered in depth in course PF-82 Carbon Capture from Stationary Industrial Sources. The focus of PF-82 is on CO_2 Capture technology – both commercial and emerging – and the background science.

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn

- Impact of GHG emissions
- Sources and characteristics of industrial CO_2-containing emissions
- Basic approaches to CO_2 capture
- Steps in the chain from Capture to Storage or Utilization
- Cost of CO_2 Capture, Transport and Storage
- Drivers and Restrainers to deployment of CCUS

Alternative Fuels Core [MUL-AFC-1-B]

STATUS	LEVEL	DURATION
Release	Core	1 hrs 21 min

This skill module covers the following topics:

- The hydrogen rainbow
- Electrolysis and Pyrolysis
- Biomass
- Ammonia

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Be able to explain the various methods of hydrogen production
- Understand the concept of green hydrogen production
- Discuss safety and integrity issues with hydrogen transportation and storage
- Understand biomass derived fuels

Solar Power Generation Core [SOL-SPG-1-R]

STATUS	LEVEL	DURATION
Released	Core	1 hr 16 min

This skill module covers the following topics:

- Concentrated Solar Energy
- Concentrated Tower
- Parabolic Trough
- Stirling Engine
- Photovoltaics

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Understand the application and development of solar thermal power plants
- Understand the development of Photovoltaic (PV) technology over time
- Be able to discuss the practical usage of Solar Power technologies in industrial and domestic application

Wind Power Generation Core [WIN-WPG-1-R]

STATUS	LEVEL	DURATION
Released	Core	1 hr 42 min

This skill module covers the following topics:

- Horizontal and Vertical Axis Wind Turbines
- Siting
- Sizing

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Be able to discuss the design and application of HAWT and VAWT wind turbines
- Calculate required wind turbine capacity based on power needed
- Calculate power available from the wind
- Choose appropriate sites for wind turbine installations
- Identify the key differences between onshore and offshore wind turbine installations

Energy Storage Core [EST-ESC-1-R]

STATUS	LEVEL	DURATION
Released	Core	1 hr 29 min

This skill module covers the following topics:

- Battery Storage
- Thermal energy storage
- Compressed and liquid air storage
- Pumped hydro-power storage
- Gravity storage

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn how to

- Identify the various methods of energy storage for peak saving and capacity optimization
- Describe electric battery energy storage
- Describe grid storage considerations
- Describe liquid air energy storage
- Discuss compressed air energy storage
- Describe pumped power energy storage
- Describe gravity energy storage

Coherent Planning for the Future Core [MUL-CPF-1-B]

STATUS	LEVEL	DURATION
Coming Soon	Core	~4 hrs

This skill module covers the following topics:

- Learning from planning failures
- The future of fossil fuel production
- Integrating electrical generation
- Predicting the cost of generation

Designed for

This course is useful for senior and middle management and for anyone involved in the integration of low carbon power generation technologies into existing and future infrastructure.

You will learn

- Understand the ‘real’ cost of renewable energy
- Gain a fundamental understanding of power supply and demand
- Gain a fundamental understanding of planning and costing of renewable energy