PetroSkills®
PetroAcademy™

2018 Skill Module Catalog

Table of Contents by Discipline:

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. See "Instructor-Led Virtual Sessions" for schedule.

Workshop = Skilled Application Competency Level, primarily instructor-led virtual sessions with online activities designed to teach skills necessary for a specific work product.

v.10 January 3, 2018

Gas Processing

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-HCP-1	Hydrocarbon Components and Physical Properties Core	Released	Core	4		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. 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, it's 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
GAS-IGC-1	Introduction to Production and Gas Processing Facilities Core	Released	Core	4		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. 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

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Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-QPB-1	Qualitative Phase Behavior and Vapor Liquid Equilibrium Core	Released	Core	4.5	Gas-IGC-1	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. You will learn how to: • Describe pure component phase behavior • Describe multicomponent phase behavior and phase envelopes • Define critical point, cricondentherm, cricondenbar, dense phase, 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)
GAS-WHP-1	Water/Hydrocarbon Phase Behavior Core	Released	Core	6	GAS-QPB-1	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. 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

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Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-TAE-1	Thermodynamics and Application of Energy Balances Core	Released	Core	4		This module provides an overview of the concepts of thermodynamics, which is the foundation for all processing calculations. This 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. You will learn how to: • State the first law of thermodynamics, and how it is applied to facilities • Understand the second law of thermodynamics, and 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.
GAS-FFC-1	Fluid Flow Core	Released	Core	4		This 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. 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

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Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-SEP-1	Separation Core	Released	Core	4		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 are emulsions, how they form and their influence on separator design. Also discussed are methods and equipment to destabilize and eliminate emulsions. 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
GAS-HTE-1	Heat Transfer Equipment Overview Core	Released	Core	4		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. 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

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Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-PCC-1	Pumps and Compressors Overview Core	Released	Core	4		This 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 module is compressors, including their applications, types and selection criteria. The module ends with a discussion of the principles of operation of the various types of compressors. 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 NPSHR 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

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Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-RNG-1	Refrigeration, NGL Extraction and Fractionation Core	Released	Core	4		This module explains the concepts of mechanical refrigeration, valve and turbine expansion, and NGL extraction systems. The module also explains the process of fractionation in oil and gas operations. 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
GAS-CRD-1	Contaminant Removal - Gas Dehydration Core	Released	Core	4		This module provides an overview of processes used to dehydrate natural gas with specific emphasis on the following two methods: 1. Absorption using glycol dehydration 2. Adsorption using molecular sieve 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

Discipline: Gas Processing

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GAS-CRA-1	Contaminant Removal - Acid Gas and Mercury Removal Core	Released	Core	4		This module explains the processes of removing mercury and acid gases from a natural gas stream. The 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) vs. acid gases injection and why liquid product treating may be required. 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

Discipline: Geology

Geology

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GEO-TSC-1	Time and Stratigraphy Core	Released	Core	4		This module describes how geologic time is represented by the presence of rock intervals in the geologic column or by the absence of equivalent rocks in the correlative columns in adjacent or distant locales. We will examine the concepts of Laws of Stratigraphy, geologic time and stratigraphy and sequence stratigraphy.
GEO-MMD-1	Marginal Marine Depositional Environments Core	Released	Core	3		This module will look at depositional processes and the resultant sedimentary rocks that occur in the Marginal Marine settings. These will include deltas as well as beaches and barrier islands. It is designed for petroleum industry personnel in need of basic geological training, including engineering, geophysical, technical support, and administrative personnel.
GEO-MDE-1	Marine Depositional Environments Core	Released	Core	4.5		This module covers depositional processes and the resultant sedimentary rocks that occur in the Clastic Marine and the Carbonate Marine settings. These include Offshore Bars, Deepwater Submarine Canyons and Fans, Carbonate Margins, and Carbonate Diagenesis.

Discipline: Geology

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description

GEO-ESD1	Erosion and Subaerial Depositional Environments Core	Released	Core	4		This module provides an overview of erosion and subaerial deposition in four key areas: weathering and erosion, alluvial fans, aeolian deposits and fluvial environments. In each section, several examples are presented to reiterate the key concepts.
						You will learn how to:
						• Differentiate between mechanical weathering and chemical weathering
						• Identify the products of mechanical and chemical weathering
						• Relate how erosion occurs, i.e. the transportation of weathering products
						• Explain what causes mass movement
						• Recognize the evidence of erosion in the geological record, i.e. unconformities (Angular unconformity, Disconformity, Nonconformity)
						• Recognize the climatic and topographic environments where alluvial fan deposits generally occur
						• Describe alluvial fan morphology
						• Explain the depositional process that take place on alluvial fans
						• Characterize the distribution of alluvial fan sediments
						• Describe the continuities and discontinuities of the sedimentary units in alluvial fans; both in a down fan and across fan direction
						• Explain where Desert environments exist
						• Realize that many deserts do not have dunes
						• Characterize dune types based on wind direction(s), grain size and sediment supply
						• Explain how dunes migrate and what the resultant internal dune stratification looks like on logs, in core and in outcrop
						• Describe the velocity distribution of water in fluvial channels
						• Differentiate between the energy levels in braided and meandering rivers
						• Characterize the differences between braided and meandering rivers and the resultant sand deposits
						• Describe which features occur on flood plains, including:
						  ○ Channels
						  ○ Point bars
						  ○ Natural levees
						  ○ Oxbow lakes
						• Characterize the reservoir properties of flood plain sand bodies including potential quality and thicknesses for each

Geophysics

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GEP-NSI-1	Nature of Seismic Image Core	Released	Core	4		This introductory module is an overview of the nature of seismic data, and how it is constructed and displayed. The purpose of the module is to familiarize learners with the nature of the seismic data that is presented to them. You will learn: • What's propagating that we can record • Forming an image by compositing or "stacking" • Reflections at a geologic interface • The problem with stacking • An introduction to seismic migration • Seismic displays in both depth or time
GEP-GAS-1	Geological Association with Seismic Reflections Core	Released	Core	4		The key to using or interpreting seismic data is to relate it to the geology and prospectivity. This module is designed to explain the basics of what is called the seismic process. You will learn: • Changes in lithology • Velocity and density • The influence of porosity and pore filling material

GEP-SDA-1	Seismic Data Acquisition Core	Released	Core	4		This 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.
						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

GEP-WSD-1	Wavelet in the Seismic Data and Limits on Resolution Core	Released	Core	4		This 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 module also discusses the recorded wavelet and its phases and the data display polarity and display conventions. 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

Discipline: Geophysics

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GEP-SVC-1	Seismic Velocities Core	Released	Core	4		This module explains 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. The module also explains how to directly measure depth vs. 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. You will learn how to: • 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
GEP-OSD-1	Overview of Seismic Data Processing Core	Released	Core	4		This module explains the concept of seismic processing flow and deconvolution. The module also explains what the processors do to produce the seismic image. You will learn how to: • Describe processing flow • Explain the concept of deconvolution • Identify what the processors do to produce the seismic image
GEP-SMC-1	Seismic Migration Core	Released	Core	4		In this module, we will 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 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. You will learn how to: • Identify migrated displays • Describe the matrix of "icons" explaining migration in time, depth, pre-stack and post-stack • Explain the relevance of each seismic migration domain • Identify the "best" seismic migration domain
GEP-DHI-1	Direct Hydrocarbon Indicators Core	Coming Soon	Core	4		The effect of hydrocarbons as a pore filling material in our seismic data is at the core of seismic interpretation. This module includes a section on rock physics. You will learn: • The effects of hydrocarbons in the seismic image • Some rock physics • Pore filling materials

Discipline: Geophysics

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
GEP-AVO-1	Amplitude vs. Offset Core	Coming Soon	Core	4		Amplitude variation with offset is used to modify risk in hydrocarbon prospects. This module introduces the concept, process and application of the technology. You will learn: • The "family" of prestack gathers • What do we expect to see in them • The effect of hydrocarbons • A clear understanding of AVO (amplitude vs offset) • The Rutherford and Williams classification • Seismic data as seen before stacking • Looking at offset gathers
GEP-SIC-1	Seismic Inversion Core	Coming Soon	Core	4		What is done to the data is very simple, but the impact on our interpretation has become a huge issue. We have literally turned the seismic data into a rock property, specifically impedance. This is probably how we will view our seismic data in the future. Don't forget about the importance of density. You will learn: • Rock parameters (Impedance) from seismic data • Inversion in a nutshell
GEP-ATC-1	Attributes Core	Coming Soon	Core	4		Attributes Core This introductory section is a quick overview of some of the rather puzzling attributes that are often shown, and ae usually poorly explained. We do not typically view our seismic data in the frequency or phase domain, but they are becoming popular displays. You will learn: • Where seismic imaging is going • Getting down to rock properties • A bit of an interpretation enigma • How to solve the resolution problem • An attribute list
GEP-SMF-2	Seismic Mapping Fundamentals	Released	Fundamentals	8		This exercise aims to provide learners an interpretation exercise that will incorporate all aspects, from start to finish, in interpreting a 3D data set, including its final conversion to depth. The exercise involves several discussion points on tying faults and the style of contouring. You will learn how to: • Identity 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

Introductory and Multi-Discipline

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
IAM-DWO-1	Defining Well Objectives Core	Released	Core	2		This 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 module are why well objectives change over the life of the asset and the commonly used key performance metrics for the drilling discipline.
IAM-BHC-1	Bits and Hydraulics Core	Coming Soon	Core	3		This module addresses roller cone and fixed cutter bit design features and their associated hydraulics programs at a core level. 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
IAM-DSB-1	Drill String and BHA Core	Released	Core	3		This module explains the various drill string components and their purpose. The module also explains the performance properties of drill strings, how to diagnose drill string mechanisms and steps to prevent drill string failures. 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

Discipline: Introductory and Multi-Discipline

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
IAM-DFS-1	Drilling Fluids and Solids Control Core	Coming Soon	Core	3		Drilling fluids impact all aspects of the drilling operation, including drilling the formations, maintaining a clean and stable wellbore, gathering data from the wellbore, and maximizing productivity of the hydrocarbon resource. Proper selection of a drilling fluid can allow optimum performance in each of these areas. Fluid processing solids control allows cost-effective maintenance of fluid properties. This module addresses these topics at a core level. 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
IAM-DDC-1	Directional Drilling and Trajectory Design Core	Coming Soon	Core	2.5		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. 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
IAM-EIA-1	E&P Industry and Asset Life Cycle Core	Released	Core	4		In this 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.
IAM-PGC-1	Petroleum Geology Core	Released	Core	2.5		In this 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 vs. regional stratigraphy.
IAM-HRC-1	Hydrocarbon Reservoirs Core	Released	Core	2		In this module you will learn about basins and plays, unconventional resources, and petroleum systems. You will also learn about structural stratigraphic traps and reservoir mapping
IAM-RFP-1	Rock and Fluid Properties Core	Released	Core	3.5		In this 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.

Discipline: Introductory and Multi-Discipline

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
IAM-SSE-1	Surface/Subsurface Exploration Core	Released	Core	3		In this module you will learn about basins, plays and risk analysis, mineral ownership and contracts; 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.
IAM-POC-1	Production Operations Core	Released	Core	2		In this 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.
IAM-DOW-1	Drilling Operations and Well Completions Core	Released	Core	3.5		In this 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.

Petrophysics

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
PPH-PDO-1	Petrophysical Data and Open Hole Logging Operations Core	Released	Core	4		This module is an 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 Well Logging, MWD/LWD, and an introduction to Petrophysics and petrophysical data acquisition. The material presented is at the most basic competency level.
PPH-MLC-1	Mud Logging, Coring and Cased Hole Logging Operations Core	Released	Core	4		This 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 most basic competency level.
PPH-GRS-1	Gamma Ray and SP Logging Core	Released	Core	3		This module continues the introduction to Petrophysical well logging tools and data interpretation. Topics include the physics and practical applications of Gamma Ray and the Spontaneous Potential log data. The material presented is at the core knowledge level.
PPH-PLC-1	Porosity Logging (Density, Neutron and Sonic) Core	Released	Core	4		This module is an introduction to Petrophysical well logging tools and data interpretation. Topics include Density, Neutron and Sonic “Porosity” Logs. The material presented is at the core knowledge level.
PPH-FTC-1	Formation Testing Core	Released	Core	4		The Formation Testing Core course 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.
PPH-RLT-1	Resistivity Logging Tools and Interpretation Core	Released	Core	4		This module continues the introduction to petrophysical well logging tools and data interpretation. Resistivity logging tools including Induction logs, Laterologs, EWR tools and Microresistivity devices and resistivity data are covered. Topics include depth of investigation and bed resolution, types of resistivity logs, and the effects of different mud systems.
PPH-PEC-1	Petrophysical Evaluation Core	Released	Core	4		This module is an introduction to Petrophysical Evaluation which integrates the concepts and data covered in the previous modules. Basic petrophysical evaluation that incorporates Gamma Ray, SP, porosity and resistivity data is covered, as well as the parameters required for saturation determination, the Archie Equations and water saturations, the effect of clay minerals on formation resistivity, the shaly sand equations, and how to conduct an integrated formation evaluation.
PPH-CAC-1	Core Analysis Core Knowledge	Released	Core	3		This module introduces the purpose of, processes and tools for basic core measurements and special core measurements; overviews Petrography and Mineralogy Data from cores as well as unconventional core analysis.
PPH-SPT-1	Special Petrophysical Tools: NMR and Image Logs Core	Released	Core	2		This 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 module covers NMR logging principles and interpretation, and the importance and application of borehole image and dipmeter data.

Process Safety

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
PRS-PSR-1	Process Safety Risk Analysis and Inherently Safer Design Core	Released	Core	4		This module provides basic concepts and definitions needed to better understand and utilize Process Safety and Inherently Safer Design. This module also includes various models, strategies and examples to better analyze and reduce risk and apply Inherently Safer Design. 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
PRS-PHA-1	Process Hazards Analysis and Layers of Protection Analysis Techniques Core	Released	Core	3		This 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. 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
PRS-LDH-1	Leakage and Dispersion of Hydrocarbons Core	Released	Core	2		This skill module covers accidental leaks and calculating concentration and dispersion of those leaks. This 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. You will learn how to: • 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
PRS-CBH-1	Combustion Behavior of Hydrocarbons Core	Released	Core	3		This module covers Combustion Behavior of Hydrocarbons. It will review vocabulary, concepts, and the factors that drive calculations regarding combustion behavior. 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

Discipline: Process Safety

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
PRS-SIH-1	Sources of Ignition and Hazardous Area Classification Core	Released	Core	3		The Sources of Ignition and Hazardous Area Classification Core 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. You will learn: • Identify the ignition characteristics of fuel • Explain the probability of leak ignition by release rate • 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 • 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
PRS-SPS-1	Specific Plant Systems and Equipment Core	Released	Core	3.75		The Specific Plant Systems and Equipment Core skill module covers several sections including, piping systems, storage facilities, pumps and compressors, heat exchangers, and pressure vessels. 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 • Discuss the issues that can occur with direct fired heaters • Explain how furnace tube failure can occur • Compare firetube and furnace fired heaters in regards 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

Discipline: Process Safety

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
PRS-RFS-1	Relief and Flare Systems Core	Released	Core	3		In this skill module you will learn about causes of overpressure, the different types of relief valves and their applications, depressurization and flare systems. You will learn: • 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
PRS-HID-1	Historical Incident Databases, Plant Layout and Equipment Spacing Core	Released	Core	3		This skill module deals with Historical Incident Databases, Process Safety Metrics, and the layout of operating facilities at the Core level. 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
PRS-SIS-1	SIS, Monitoring and Control Core	Released	Core	4		This skill module is comprised of two sections; Safety Instrumented Systems, and Monitoring and Control. Within this module, you will find multiple control method examples, the concepts of SIL and SIF, along with a case study that highlights the module. 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 • Discuss the application of SCADA, DCS, MVC, MIS • Describe what Safety Instrumented Systems are • 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

Discipline: Process Safety

Code	Skill Module Name	Status	Level	Hrs	Pre-Req	Description
PRS-FPS-1	Fire Protection Systems Core	Released	Core	4		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. You will learn how to: • Describe the main fire protection strategies • Discuss the elements of passive and active fire protection • Explain the application of commonly used fireproofing materials • Identify areas of application for fire and blast walls Discuss the application of drainage, containment, and remote impounding • Discuss applications for firewater and foam • Explain the reasons for typical firewater loop design requirements • Discuss the role of remotely operated isolation and depressuring valves in prevention and mitigation of fire and explosion • Discuss the objectives and applications of fire and gas alarm systems
PRS-RAI-2	Risk Analysis and Inherently Safer Design Fundamentals	Released	Fundamentals	8.5		This fundamental module builds on Risk Analysis and Inherently Safer Design from the core module. It includes an in-depth look at each of the topics listed and assigned readings that are associated with group exercises. You will learn how to: • Explain the relationship between the elements and the pillars (foundation blocks) • Describe the main Quantitative and Semi-Quantitative risk analysis methods and their applications • Describe the commonly used methods for estimating frequency and consequence of failure • Apply Risk Assessment to an exercise that will run throughout this module • Describe the use of ISD in upstream, midstream, and downstream assets • Explain ISD applications at different stages of the facility lifecycle • Apply Inherently Safer Design to an exercise
PRS-PHA-2	PHA Techniques and LOPA Fundamentals	Released	Fundamentals	8		This fundamental module builds on Process Hazards Analysis Techniques and Layers of Production from the core module. It includes an in-depth look at each of the topics listed and assigned readings that are associated with group exercises. You will learn how to: • Outline the problem areas that can lead to failure of a HAZOP • Explain how Historical Incident Databases can be used in a PHA • Discuss applications of API 14C • Explain methods for evaluating consequence and frequency • Apply Process Hazards Analysis to a case • Explain how LOPA is applied and how it can be used in making risk decisions • Apply Layers of Protection Analysis to a case

Production and Completion

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-PPC-1	Production Principles Core	Released	Core	5		This module introduces four characteristics of optimum oil and gas depletion production principles, namely: Effects of Geological and Reservoir Properties · Inflow and Outflow Performance; Tubing Strings, Outflow, and Lift Mechanics; and Field Development Planning. Each is examined to illustrate the importance of up front data acquisition to perform studies to understand target design objectives for conventional oil and gas reservoirs and unconventional shale oil and shale gas reservoirs and unconventional coal bed methane reservoirs.
PCE-WPN-2	Well Performance and Nodal Analysis Fundamentals	Released	Fundamentals	10	PCE-PPC-1	This module explains the key principles in analyzing well performance parameters of any production (or injection) well using the principles and practices of NodalTM analysis, also referenced as system analysis. Inflow and outflow equations are developed, multiphase hydraulics are reviewed, the building blocks of NodalTM analysis are expanded, and several exercises are worked.
PCE-OCW-1	Onshore Conventional Well Completion Core	Released	Core	4	PCE-WPN-2	This module describes the major tools, techniques, and processes for completing wells in conventional situations. Topics include: basic operational aspects of wellhead, flow control equipment, drilling practices, common subsurface equipment, steps for implementing completion procedures, and well flows.
PCE-OUW-1	Onshore Unconventional Well Completion Core	Released	Core	4	PCE-OCW-1	In the last 15-20 years, with the development of shale drilling and completion methodologies, Unconventionals have become front page news. 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 module is on horizontal shale wells but also includes a section on Coalbed Methane and one on Heavy Oil as well.
PCE-PRC-1	Primary and Remedial Cementing Core	Released	Core	4	PCE-OUW-1	This 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. Preliminary lab work to formulate primary cement blends is described. Several cement squeeze techniques are explained and recommended practices are described.
PCE-PEC-1	Perforating Core	Released	Core	3	PCE-OUW-1	This 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.
PCE-RPJ-1	Rod, PCP, Jet Pump and Plunger Lift Core	Released	Core	5	PCE-PRC-1 PCE-PEC-1	This module will specifically describe the engineering design and operational requirements of Rod Pump, Progressing Cavity Pump (PCP), Jet Pump, and Plunger Lift well completions types. How to evaluate reservoir and well conditions to choose the appropriate artificial lift system for each set of conditions is also covered.
PCE-RRP-2	Reciprocating Rod Pumps Fundamentals	Released	Fundamentals	9	PCE-RPJ-1	This module focuses upon the three main components of a rod pump well completion, namely, the surface unit, the rod string, and the downhole pump. Each component is examined and investigated to define the rod pump completion loading parameters. Related rod pump design considerations necessary for optimizing rod pump design and operation are presented.

Discipline: Production and Completion

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-GLE-1	Gas Lift and ESP Pump Core	Released	Core	4	PCE-PEC-1	This 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.
PCE-GLF-2	Gas Lift Fundamentals	Released	Fundamentals	7	PCE-GLE-1	This 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.
PCE-ESP-2	Electrical Submersible Pumps Fundamentals	Released	Fundamentals	6	PCE-GLE-1	This 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.
PCE-FDC-1	Formation Damage and Matrix Stimulation Core	Released	Core	3	PCE-PEC-1	Unexpected loss of production following initial completion or a well intervention job is not always due to the same set of circumstances. Topics covered include: the basic causes of oilfield formation damage and how they are recognized; the concept of “True Formation Damage” and the principles of formation remediation; how “pseudo” damage and differs from True Formation Damage; limestone matrix acidizing; and sandstone matrix acidizing.
PCE-FDF-2	Formation Damage and Matrix Acidizing Fundamentals	Released	Fundamentals	9	PCE-FDC-1	The module addresses the complex oilfield phenomena that studies and attempts to resolve the varied causes of oil and gas production shortfalls. Topics covered include: the impact of formation damage upon production; the reasons, sources, depositional environments, and routine operations’ activities that result in production limitations; formation damage “skin” values; production rate calculations with and without formation damage; how TFD and PD are recognized and the characteristics and elements of each; method to stabilize negatively charged clays to limit clay migration, hydration, and other damaging mechanisms.
PCE-FAP-1	Flow Assurance and Production Chemistry Core	Released	Core	5	PCE-FDC-1	This module examines typical oilfield "flow assurance" issues and problems and the identification and remediation, and preventive aspects of common wax, asphaltene, scale, and corrosion problems common to most hydrocarbon production scenarios in one manner or another. Each of these problems requires the application of varied principles and practices of production chemistry. Pictures, illustrations, and examples of typical field problems and challenges faced present proven, least cost, safe remedies to return production to its initial, expected rate.
PCE-SCC-1	Sand Control Core	Released	Core	3	PCE-FDC-1	This 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.
PCE-SCF-2	Sand Control Fundamentals	Released	Fundamentals	7	PCE-SCC-1	This module develops skills necessary to design a basic tip screen-out fracpack treatment. A common computer model is used to perform specific calculations. Data analysis during and after the treatment for optimization purposes is also covered.

Discipline: Production and Completion

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-HFC-1	Hydraulic Fracturing Core	Released	Core	4	PCE-FDC-1	The hydraulic fracturing core 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.
PCE-PPD-1	Production Problem Diagnosis Core	Released	Core	3	PCE-FDC-1	This module describes the causes and effects of most common well problems and remediation approaches. Topics include: field collected data; conventional and unconventional resources plays; drill stem and production tests; validating collected data; pressure buildup analysis; the effect of pressure on fluid flow, Inflow Performance Relationship analysis principles, and the best tubing correlations when modeling vertical and horizontal wells; and the importance of applying and complying with all requirements to ensure integrity throughout life cycle of a well.
PCE-PLC-1	Production Logging Core	Released	Core	3	PCE-PPD-1	This module describes purpose of running cased-hole production logs, the type of data collected, how a logging tool is run in a well, and recognize data obtained from running the most common logging tools in conventional and unconventional resources plays.
PCE-PLF-2	Production Logging Fundamentals	Released	Fundamentals	7	PCE-PLC-1	This module develops skills necessary to validate and interpret data from the most common production logging tools, supervise logging operations onsite, and identify programs and instrumentation used in common situations.
PCE-DEC-1	Design Process for Completions and Workovers Core	Released	Core	3		This module focuses upon the 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. In this core module, participants are exposed to these three design work products, and will learn how to interpret each of the individual components. And, once executed, participants will learn how to read and assess the daily morning reports. 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-DEF-2	Completion Design Fundamentals	Released	Fundamentals	10		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 on, conduits, circulating and killing wells, inflow and outflow, along with well barriers and well servicing fluids, and a few more. You will learn how to: • Recognize the various design concepts which will be covered throughout the rest of this 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-WCF-2	Well Completions Fundamentals	Released	Fundamentals	9		This Well Completions Fundamental module covers five sections including well completion equipment, packers, landing nipple and lock mandrel systems, safety valves, and circulation devices. 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 • 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, flow couplings • Demonstrate uptake of the modules that have been covered up to this point • Identify areas requiring review • Design a completion, incorporating equipment, reservoir data, fluid data, etc.

Discipline: Production and Completion

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-WIC-1	Well Intervention Core	Released	Core	3		This 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, entering a "live" well. You will learn how to: • Describe the main components of a slickline unit • Describe the main components of a braided wireline unit • Describe the main components of an electric line unit • Describe the main components of a conventional workover (completion) unit • Describe the main components of a snubbing (hydraulic workover) unit • Describe the main components of a coiled tubing unit • Compare the critical operational benefit and/or constraints of each of these methods
PCE-WOF-2	Workover Fundamentals	Released	Fundamentals	9		This Workover Fundamentals course is designed to help you follow a workover process to solve well problems. This course 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. 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 exists • 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

Discipline: Production and Completion

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
PCE-TRP-1	The Role of Production Technology Core	Released	Core	2		This PetroSkills PetroAcademy blended skills module addresses the concept of Production Technology and the production technologists who define and implement the details of managing a hydrocarbon asset. Production technologists, or a company's PTs as they are often described or labeled, are subject matter experts (SMEs) across all oilfield disciplines who contribute both formally and semi-formally throughout an asset's life. Their team work and focus continually brings both proven oilfield practices as well as prototype emerging and new technology to fruition in a hydrocarbon exploitation development. This 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.
PCE-PTA-1	Production Technology Applications Core	Released	Core	5		Scale Identification, Remediation and Prevention is an essential part of a production or workover engineer's scope of work. This workshop provides a comprehensive overview of dilemmas in operating producing and injection wells relating to the presence of a variety of oilfield scale types – primarily reduction in pipe carry capacity and localization of corrosion attack – deposition mechanisms, identification methods, various removal techniques and methodologies for its prevention. Upon completion, participants will be aware of the scale problem, understand ways to remediate it and prevent it subsequent deposition. Specific mathematical scale prediction methods are presented and numerous preventive methods, both chemical and unique approaches, are covered.
PCE-NAW-3	Nodal Analysis Workshop	Released	Workshop	38	PCE-WPN-2	Well Inflow/ Outflow (NODALTM) Analysis is an integral part of a production or completion engineer's work scope. This workshop is a comprehensive overview of this technique, emphasizing real world application through multiple problems from different perspectives. Upon completion, participants will be able to approach a problem recognizing potential solution methods, prepare data for analysis, identify sources of error, perform an analysis with industry software, and present a holistic recommendation.
PCE-SIR-3	Scale Identification, Remediation, and Prevention Workshop	Released	Workshop	16		Scale Identification, Remediation and Prevention is an essential part of a production or workover engineer's scope of work. This workshop provides a comprehensive overview of dilemmas in operating producing and injection wells relating to the presence of a variety of oilfield scale types – primarily reduction in pipe carry capacity and localization of corrosion attack – deposition mechanisms, identification methods, various removal techniques and methodologies for its prevention. Upon completion, participants will be aware of the scale problem, understand ways to remediate it and prevent it subsequent deposition. Specific mathematical scale prediction methods are presented and numerous preventive methods, both chemical and unique approaches, are covered.

Reservoir Engineering

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-TRE-1	This is Reservoir Engineering	Released	Core	3		This skill module is an introduction to the blended version of the Applied Reservoir Engineering course. You will learn: • About the Principal Tasks of a Reservoir Engineer • About the Principal Tools of a Reservoir Engineer • How this course is organized to cover these topics
RES-RRP-1	Reservoir Rock Properties Core	Released	Core	3		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
RES-RRP-2	Reservoir Rock Properties Fundamental	Released	Fundamentals	8	RES-RRP-1	This module introduces the concepts or wettability, capillary pressure and relative permeability, and discusses how they are measured and modeled for reservoir behavior description. You will learn how to: • Describe the concept of fluid contacts • Describe how saturations change when crossing • 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 • 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 module to build relative permeability and capillary data datasets
RES-RFC-1	Reservoir Fluid Core	Released	Core	4		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

Discipline: Reservoir Engineering

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RFF-2	Reservoir Fluid Fundamentals	Released	Fundamentals	7		Reservoir Fluid Fundamentals explores the calculation fluid properties such as formation volume factors, viscosities and densities for a wide range of fluids under reservoir conditions. You will learn how to calculate fluid properties needed for: • Volumetrics • Material Balance • Fluid Flow using Darcy's Law • Pressure Transient Analysis • Rate Transient Analysis • Fluid Displacement • Many other types of analysis
RES-RFP-1	Reservoir Flow Properties Core	Released	Core	4		This Reservoir Flow Properties Core module discusses the extensions and limitations of Darcy's Law. This 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. 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 do 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RFP-2	Reservoir Flow Properties Fundamentals	Released	Fundamentals	6	RES-RFP-1	This Reservoir Flow Properties Fundamentals 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 module also includes an interactive virtual phase where the learner works with the instructor virtually to analyze and solve problems. 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RMB-1	Reservoir Material Balance Core	Released	Core	4		This Reservoir Material Balance Core 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. 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
RES-RMB-2	Reservoir Material Balance Fundamentals	Released	Fundamentals	6	RES-RMB-1	You will learn how to: • Calculate volumetric estimates. • Adjust volumetric estimates for transition zones and calculate recovery factors. • Perform material balance analysis. • Leverage straight-line expressions of material balance equations to analyze gas reservoirs. • Leverage straight-line expressions of material balance equations to analyze oil reservoirs
RES-RSA-1	Decline Curve Analysis and Empirical Approaches Core	Released	Core	3		This course introduces the use of statistical methods in reservoir engineering. A range of applications are described, concentrating on decline curve analysis. You will learn how to: • Perform Basic Statistics • Calculate Decline Curve Analysis • Estimate Recovery Factors

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RSA-2	Decline Curve Analysis and Empirical Approaches Fundamentals	Released	Fundamentals	6	RES-RSA-1	This module describes the application statistical methods to solve reservoir engineering challenges. The emphasis will be on decline curve analysis and curve fitting measured data such as relative permeability. You will learn: • Exponential, Hyperbolic and Harmonic decline curve application • Transient vs. 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
RES-RRC-1	Reserves and Resources Core	Released	Core	4		This module brings your attention to reserves management and the difference between resources and reserves at a core competency level. 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
RES-PTA-1	Pressure Transient Analysis Core	Released	Core	4		This 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. You will learn: • The pressure transient analysis concepts, terminology, equations and objectives • About pressure transient analysis in buildup and drawdown tests • Time period analysis - challenges and objectives • Semi-log and log-log analysis

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RTA-1	Rate Transient Analysis Core	Released	Core	4		This Rate Transient Analysis Core 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. 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 situations.

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RFD-1	Reservoir Fluid Displacement Core	Released	Core	3		This covers immiscible, linear displacement, as dispersed and segregated flow. It also discusses aquifers, coning, and vertical layering. You will learn: • About immiscible fluid displacement linearly and vertically • About dispersed and segregated flow • About aquifers models • Coning in oil/water systems, including when it is most likely to occur, and how to prevent it
RES-RFD-2	Reservoir Fluid Displacement Fundamentals	Released	Fundamentals	6	RES-RFD-1	This module covers the same topics as 'Reservoir Fluid Displacement Core', but goes into greater detail. Those topics are: • Immiscible, linear displacement, as dispersed and segregated flow • Aquifers • Coning • Vertical layering 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
RES-EOR-1	Enhanced Oil Recovery Core	Released	Core	4		This 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. 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-IOR-2	Improved Oil Recovery Fundamentals	Coming Soon	Fundamentals	6		You will learn: • Different types of waterfloods • Waterfloods vs. pressure maintenance • Patterns vs. peripheral • Different kinds of patterns • Horizontal vs. vertical wells vs. hydraulic fracs in waterfloods • Planning waterfloods • Application of material balance • Application of simulation • Calculation of heterogeneity indices • Pilots vs. staged developments • Flooding fractured reservoirs

RES-RSI-1	Reservoir Simulation Core	Released	Core	4		This module describes how reservoir simulations are used, what goes into them, how they do their calculations, and what comes out of them.
						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

RES-RSC-1	Reservoir Surveillance Core	Released	Core	4		This module brings your attention to reservoir surveillance (RS) objectives, activities, plans and their link to uncertainty. You will learn: • A surveillance plan 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
RES-RSF-2	Reservoir Surveillance Fundamentals	Released	Fundamentals	6	RES-RSC-1	This 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. 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

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Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
RES-RMC-1	Reservoir Management Core	Released	Core	4		You will learn how to: • Describe the inter-relationship between reservoir engineering and other disciplines, and how integration helps optimize the value of corporate assets. • Describe how the value of an asset is defined. Explain the roles of risk and uncertainty in that valuation. • Describe types of wells, and the conditions under which each is most advantageous, describe how facilities affect field development. • Describe different intervention techniques that may improve well performance. • Describe the types of enhanced oil and enhanced gas recovery techniques available.
RES-RMF-2	Reservoir Management Fundamentals	Released	Fundamentals	6	RES-RMC-1	You will learn how to: • Integrate technologies from multiple disciplines to optimize asset value. • Calculate asset value, explain contingency planning. • Identify the geologic and reservoir parameters critical for optimal well spacing and orientation. • Compare actual performance to expected performance to determine if intervention is required. • Conduct analysis to determine the most appropriate EOR technique (if any) for a particular reservoir situation. • Estimate number of annual abandonments, and plan workover activities accordingly.

Well Construction / Drilling

Code	Skill Module Name	Status	Level	Hr	Pre-Req	Description
WCD-CDW-3	Casing Design Workshop	Released	Workshop	37		Casing design is an integral part of a drilling engineer's work scope. This workshop provides a comprehensive overview of the design process, emphasizing the working stress approach currently used in the industry. Upon completion, participants will be able to select casing points, identify tubular requirements, loads, and present a design which incorporates life cycle considerations. Estimation of standard and special loads is covered in detail. Standard theories of strength and failure are discussed as well as advanced considerations for combined loads. Topics related to safe handling, running and hanging practices will also be covered.
WCD-CRO-1	Casing Running Operations Core	Released	Core	5		This modules covers the steps of running casing, from the rig to the borehole. Topics include: safe working practices while running casing on a rig; responsibilities and organization of wellsite personnel for normal casing operations; the purpose of basic running casing equipment and the key steps used to run casing.
WCD-OCC-1	Oilfield Casing Core	Released	Core	4		This module covers the purpose of casing in an oilfield well. Topics included are: how joints of casing are connected; the steps in the process for drilling and cementing casing; awareness of API/ISO casing naming conventions; advantages and disadvantages to casing produced with seamless and ERW properties; casing descriptions and dimensions and their correlation; identifying casing in a wellbore schematic.