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.

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Gas Processing

GAS-HCP-1			
Hydrocarbon Components and Physical Properties Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 45 min	

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

- Describe the concept of atomic mass, molecular mass, and the mol
- Identify the four main hydrocarbon groups
- Practice the concept of relative density
- Discuss how a gas chromatograph works, the limitations of various analysis methods, and the difference between an extended analysis and a standard gas chromatographic analysis
- Recognize the uncertainties involved with characterizing the C6+ components in a natural gas, condensate or crude oil stream, and describe the relationship of these factors with hydrocarbon liquid composition
- Describe an Equation of State, 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 16 min	

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

GAS-QPB-1			
Qualitative Phase Behavior and Vapor Liquid Equilibrium Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 35 min	

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

Discipline: Gas Processing

GAS-WHP-1			
Water/Hydrocarbon Phase Behavior Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	6 hrs	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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How to:

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

GAS-TAE-1			
Thermodynamics and Applications of Energy Balances Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 15 min	

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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

GAS-FFC-1			
Fluid Flow Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	5 hrs 5 min	

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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

Discipline: Gas Processing

GAS-SEC-1			
Separation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 50 min	

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

GAS-HTE-1			
Heat Transfer Equipment Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 10 min	

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

Discipline: Gas Processing

GAS-PCC-1			
Pumps and Compressors Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	5 hrs 48 min	

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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn How To

- Identify types of pumps and common applications in oil and gas processing facilities
- Describe how a pump selection chart can be used to select pump type
- Explain the relationship between head and pressure
- Calculate the pump power requirement
- Describe the differences in performance characteristics of centrifugal and positive displacement pumps
- Describe cavitation
- Define 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 • 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

GAS-RNG-1			
Refrigeration, NGL Extraction, and Fractionation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	5 hrs 27 min	

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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

GAS-CRD-1			
Contaminant Removal – Gas Dehydration Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 37 min	

This module provides an overview of processes used to dehydrate natural gas with specific emphasis on the following two methods:

- Absorption using glycol dehydration
- Adsorption using molecular sieve

Designed for

- Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn How To

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

GAS-CRA-1			
Contaminant Removal – Acid Gas and Mercury Removal Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 49 min	

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.

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers.

You Will Learn

How To

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

Geology

GEO-TSC-1			
Time and Stratigraphy Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 52 min	

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.

Designed for

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

You Will Learn
How To

- Describe the six basic laws of stratigraphy
- Differentiate between relative and absolute geologic time
- Use the geological time scale
- Relate deposition to stratigraphic concepts
- Differentiate between:
- ◦ Lithostratigraphy, which is based on correlating rock type
- ◦ Chronostratigraphy rock type but based on time equivalence
- ◦ Biostratigraphy using fossils to help identify what time things were deposited
- ◦ And Magnetostratigraphy, which is based on rock magnetic properties
- Explain the connection between correlation stratigraphy and reservoirs
- Define sequence stratigraphic terminology
- Recall how to use the highstand and lowstand system tracts in exploration
- Relate deposition to stratigraphic concepts
- Describe the connection between correlation, stratigraphy, and reservoir

GEO-MMD-1			
Marginal Marine Depositional Environments Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 39 min	

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.

Designed for

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

You Will Learn

In the Deltaic sessions, you will learn about:

- Formation of distributary channels, distributary mouth bars, bar fingers, and crevasse splays
- About delta morphology related to shelf slope
- Control of reservoir morphology and orientation by sediment input, wave energy, and tidal range
- About delta type related to river type—fan, braid, and common deltas

In the Beach and Barrier Island sessions, you will learn about:

- The cause of longshore transport
- About beach development and sand supply
- The character of beaches at different energy levels
- ◦ Slope of the beach
- ◦ Grain size on the beach
- About barrier island offset and longshore current direction
- About grain size distribution in a beach/barrier—coarsening upward
- About lateral facies changes from the barrier island into the basin and the lagoon

GEO-MDE-1			
Marine Depositional Environments Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 36 min	

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.

Designed for

Petroleum industry personnel in need of basic geological training, including engineering, geophysical, petrotechnical support, and all types of administrative and logistical support personnel.

You Will Learn
How To

- Describe the redistribution of sediment on the shelf from previously deposited depositional environments
- Explain how offshore bars form
- ◦ Morphology
- ◦ Sediment type and character
- Recognize the distribution of sediments on a bar: drowned barrier island vs. current re-working
- Recognize offshore bars in outcrop and on well logs
- Describe how Channel-levee complexes are formed:
- ◦ Morphology
- ◦ Sediments
- Describe the distribution of sediments on a submarine fan
- Relate Turbidity currents and Turbidites to Bouma sequences in pictures and outcrop
- Explain the exploration potential of deepwater deposits
- Identify the enhancement and/or loss of carbonate reservoir quality that occurs during diagenesis
    - Changes in porosity and permeability
    - Types of secondary porosity in carbonates
        - Moldic
        - Vuggy
        - Cavernous
        - Skeletal and Oomoldic
        - Fracture

Discipline: Geology

GEO-ESD-1			
Erosion and Subaerial Depositional Environments Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs	

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.

Designed for

Petroleum industry personnel in need of basic geological training, including engineering, geophysical, petrotechnical support, and all types of administrative and logistical support personnel.

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

GEP-NSI-1			
Nature of Seismic Image Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 14 min	

This introductory module explains at a very fundamental level how to identify a seismic image and how it relates to geology. Also explained are how seismic images are formed and displayed and the differences in analyzing seismic images in time and depth domains.

Designed for

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

You Will Learn

How To

- Differentiate between depth and time
- Identify how a seismic image is displayed
- Describe how a seismic image is formed
- Identify a seismic image
- Explain how a seismic image relates to geology

GEP-GAS-1			
Geological Association with Seismic Reflections Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 51 min	

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

Designed for

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

You Will Learn

How To

- Describe the lithology and how it relates to the seismic image
- Relate the logs to the seismic data
- Identify the effect of pore filling material on velocity and density

GEP-SDA-1			
Seismic Data Acquisition Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 32 min	

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.

Designed for

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

You Will Learn

How To

- Describe the marine configuration for a 3D survey including:
  - Components used for data acquisition
  - Arrays to attenuate noise
  - Bin gathering as a CMP assemblage of reflections
- Describe the land configuration for a 3D survey including:
  - Bin gathering for a land 3D survey
- Compare the costs of 2D and 3D surveys

GEP-WSD-1			
Wavelet in the Seismic Data and Limits on Resolution Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 25 min	

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.

Designed for

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

You Will Learn

How To

- Identify why the vertical resolution of the seismic data is a critical issue
- Explain how the resolution is controlled by the propagating wavelet that is generated by the acquisition parameters
- Identify the recorded wavelet and its phase
- Describe the data display polarity and display conventions

GEP-SVC-1			
Seismic Velocities Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 37 min	

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.

Designed for

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

You Will Learn
How To

- Identify 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 5 min	

This module explains the concept of seismic processing flow and deconvolution. The module also explains what the processors do to produce the seismic image.

Designed for

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

You Will Learn

How To

- Describe processing flow
- Explain the concept of deconvolution
- Identify what the processors do to produce the seismic image

GEP-SMC-1			
Seismic Migration Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 30 min	

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.

Designed for

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

You Will Learn

How To

- Identify 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-SMF-2			
Seismic Mapping Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	6 hrs 15 min	

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

Designed for

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

You Will Learn

How To

- 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

GEP-DHI-1			
Direct Hydrocarbon Indicators Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 2 min	

This module explains that the effect of hydrocarbons as a pore filling material in our seismic data is at the core of seismic interpretation. This module also includes a section on rock physics.

Designed for

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

You Will Learn

How To

- Explain the effect of hydrocarbons in the seismic data
- Detect hydrocarbons in the seismic data
- Describe rock physics

Discipline: Geophysics

GEP-AVO-1				GEP-SIC-1				GEP-ATC-1			
Amplitude vs. Offset Core				**Seismic Inversion Core**				**Attributes Core**			
STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hr 50 min		Released	Core	3 hrs		Released	Core	2 hrs 30 min	
Amplitude variation with offset is used to modify risk in hydrocarbon prospects. This module introduces the concept, process, and application of the technology. Designed for Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it. You Will Learn • 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				What is done to the data is very simple, but the impact on our interpretation has become a huge issue. In this module, we learn to 'inverse' the seismic data into a rock property, specifically impedance. Also discussed is the types of inversion algorithms and their application. Designed for Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it. You Will Learn How To • Explain the seismic inversion processes, both forward and inverse • Identify relative and absolute impedance in seismic inversion • Identify the inversion algorithms and their application				This introductory section is a quick overview of some of the rather puzzling attributes that are often shown and usually poorly explained. We do not typically view our seismic data in the frequency or phase domain, but they are becoming popular displays. Designed for Geoscientists, engineers, team leaders, geoscience technicians, asset managers, and anyone involved in using seismic data that needs to understand and use this data at a basic level or to communicate with others that use it. You Will Learn • 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			

Introductory and Multi-Discipline

IAM-DWO-1			
Defining Well Objectives Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	1 hrs 20 min	

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.

Designed for

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

You Will Learn

How To

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

IAM-BHC-1			
Bits and Hydraulics Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 31 min	

This module addresses roller cone and fixed cutter bit design features and their associated hydraulics programs at a core level.

Designed for

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

You Will Learn

How To

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

IAM-DSB-1			
Drill String and BHA Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 5 min	

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 the steps to prevent drill string failures.

Designed for

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

You Will Learn

How To

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

IAM-DFS-1			
Drilling Fluids and Solids Control Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 16 min	

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.

Designed for

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

You Will Learn

How To

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

IAM-DDC-1			
Directional Drilling and Trajectory Design Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 37 min	

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

Designed for

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

You Will Learn

How To

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

IAM-EIA-1			
E&P Industry and Asset Life Cycle Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 5 min	

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.

Designed for

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

You Will Learn

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

Skill Module Content

- The Petroleum Industry – Past to Present
- Introduction to the Asset Life Cycle
- Economic Drivers

Discipline: Introductory and Multi-Discipline

IAM-PGC-1			
Petroleum Geology Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 35 min	

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.

Designed for

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

You Will Learn

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

Skill Module Content

- Earth Structure and Plate Tectonics
- Rock Classes and Depositional Environment
- Historical Geology

IAM-HRC-1			
Hydrocarbon Reservoirs Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 10 min	

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.

Designed for

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

You Will Learn

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

IAM-RFP-1			
Rock and Fluid Properties Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 35 min	

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.

Designed for

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

You Will Learn

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

Skill Module Content

- Reservoir Rock Properties
- Reservoir Fluid Properties and Flow Characteristics
- Hydrocarbon Reservoir Classification
- Hydrocarbon Recovery

Discipline: Introductory and Multi-Discipline

IAM-SSE-1			
Surface/Subsurface Exploration Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3h 10m	

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

Designed for

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

You Will Learn

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

IAM-POC-1			
Production Operations Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs	

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.

Designed for

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

You Will Learn

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

IAM-DOW-1			
Drilling Operations and Well Completions Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 25 min	

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.

Designed for

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

You Will Learn

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

Petrophysics

PPH-PDO-1			
Petrophysical Data and Open Hole Logging Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3h 57m	

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.

Designed for

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

You Will Learn

- The concept, scope and basics of "Petrophysics"
- How Petrophysics integrates with the other subsurface specialties (Geology, Geophysics, Reservoir Engr., Drilling Engr.)
- The importance of sufficient petrophysical data to achieve correct reservoir modeling
- The emphasis is on borehole environment and openhole logging

Skill Module Content

This skill module covers the basics of:

- Petrophysical data acquisition
- Openhole well logging
- MWD/LWD

PPH-MLC-1			
Mud Logging, Coring and Cased Hole Logging Operations Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 21 min	

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.

Designed for

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

You Will Learn

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

Skill Module Content

This skill module covers the basics of:

- Mud logging
- Coring
- Cased hole logging

PPH-GRS-1			
Gamma Ray and Spontaneous Potential Logging Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 47 min	

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

Designed for

- Geoscientists and engineers who desire a working knowledge of Petrophysics
- Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels wanting a basic background in the petrophysics discipline
- This module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees

You Will Learn

- The physics and applications of Gamma Ray and Spontaneous Potential log data

Skill Module Content

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

PPH-PLC-1			
Porosity Logging (Density, Neutron, and Sonic) Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 47 min	

This module continues the introduction to Petrophysical well logging tools and data interpretation. Topics include Density, Neutron, and Sonic "Porosity" Logs. The material presented is at the core knowledge level.

Designed for

- Geoscientists and engineers who desire a working knowledge of Petrophysics
- Ideal for other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels desiring a basic background in the petrophysics discipline
- This module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P Industry including Service Company and Government employees

You Will Learn

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

Skill Module Content

- Density logging tool function and applications
- Neutron logging tool function and applications
- Density/Neutron combination logging tools applications
- Sonic logging tool function and applications

PPH-FTC-1			
Formation Testing Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 15 min	

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.

Designed for

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

You Will Learn

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

PPH-RLT-1			
Resistivity Logging Tools and Interpretation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 35 min	

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 as well as resistivity data are covered. Topics include depth of investigation and bed resolution, types of resistivity logs, and the effects of different mud systems.

Designed for

- Geoscientists and engineers who desire a working knowledge of Petrophysics and hydrocarbon evaluation.
- Other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels desiring a basic background in the petrophysics discipline.

This module lays the foundation for effective communications between the Subsurface Team and everyone else in the E&P industry including service company and government employees.

You Will Learn

- Operating tool physics and data applications of the various resistivity logging tools
- Selection criteria for which tool provides the best resistivity data for different environments (mud types, formation resistivity ranges, etc.)
- The latest Array resistivity tools
- The transverse induction device for highly anisotropic formations

Skill Module Content

- The Resistivity Logging Tools – Old Electric Logs
- Depth of investigation and bed resolution
- Induction Logs
- Laterologs
- Microresistivity Logs

PPH-PEC-1			
Petrophysical Evaluation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 52 min	

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

Designed for

- Geoscientists and engineers who desire a working knowledge of Petrophysics and hydrocarbon evaluation
- Other technical staff and non-technical staff (e.g., management, drilling operations, technical support staff, finance, legal, IT, supply chain management, and others) at all experience levels desiring a basic background in the petrophysics discipline
- Ideal for Service Company and Government employees working with the E&P Industry
- This module lays the foundation for effective communications between the Subsurface Team and everyone in the E&P Industry

You Will Learn

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

Skill Module Content

- What Is Petrophysical Evaluation?
- Understanding Reservoir Saturation
- Net Reservoir, Net Pay, and N/G
- Porosity and Quick-Look Petrophysics
- Resistivity, Archie, and Saturation Determination
- Petrophysical Evaluation Approach
- Saturation Models in Shaly Sands

PPH-CAC-1			
Core Analysis Core Knowledge			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 40 min	

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

Designed for

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

You Will Learn

How To

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

PPH-SPT-1			
Special Petrophysical Tools: NMR and Image Logs Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 5 min	

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.

Designed for

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

You Will Learn

How To

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

Process Safety

PRS-PSR-1			
Process Safety Risk Analysis and Inherently Safer Design Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 57 min	

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.

Designed for

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

You Will Learn

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

PRS-PHA-1			
Process Hazards Analysis and Layer of Protection Analysis Techniques Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 20 min	

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.

Designed for

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

You Will Learn

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

PRS-LDH-1			
Leakage and Dispersion of Hydrocarbons Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 20 min	

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.

Designed for

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

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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 10 min	

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

Designed for

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

You Will Learn

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

PRS-SIH-1			
Sources of Ignition and Hazardous Area Classification Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs	

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

PRS-SPS-1			
Specific Plant Systems and Equipment Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 35 min	

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.

Designed for

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

You Will Learn How To

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

PRS-RFS-1			
Relief and Flare Systems Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 5 min	

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

Designed for

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

You Will Learn

How To

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

PRS-HID-1			
Historical Incident Databases, Plant Layout, and Equipment Spacing Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 55 min	

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

Designed for

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

You Will Learn

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

PRS-SIS-1			
SIS, Monitoring and Control Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 42 min	

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 and the concepts of SIL and SIF, along with a case study that highlights the module.

Designed for

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

You Will Learn

How To

- Define and explain process control
- Identify the process safety instrumentation goals
- Identify and discuss the methods of control
- Describe the elements of feedback, cascade, and feedforward control
- Explain control modes and the elements of alarm philosophy
- Discuss the application of SCADA, DCS, MVC, MIS
- Describe 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

PRS-FPS-1			
Fire Protection Systems Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 30 min	

This module covers Fire Protection Systems at a core level. You will review the intent of fire protection as well as examples and applications of passive and active fire protection. This section will briefly cover explosion protection.

Designed for

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

You Will Learn

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

PRS-RAI-2			
Risk Analysis and Inherently Safer Design Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 27 min	

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.

Designed for

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

You Will Learn

How To

- Explain the 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 19 min	

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.

Designed for

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

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

PCE-PPC-1			
Production Principles Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 52 min	

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

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

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

Designed for

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

You Will Learn

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

PCE-WPN-2			
Well Performance and Nodal Analysis Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 58 min	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 NODAL™ analysis, also referenced as system analysis. Inflow and outflow equations are developed, multiphase hydraulics are reviewed, the building blocks of NODAL™ analysis are expanded, and several exercises are worked.

Designed for

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

You Will Learn

How To

- Collect and validate required data to evaluate well performance using computer modeling and performance history matching, and predict potential problems
- Develop NODAL™ analysis models
- Select the optimum diameter tubing string for any completion at any time in the life of the well
- Determine when artificial lift should be considered for an oil well
- Identify flow restrictions from basic inflow performance analysis, recommend actions to improve well productivity, and describe how to analyze flowline and choke options

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

PCE-OCW-1			
Onshore Conventional Well Completion Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 3 min	PCE-WPN-2

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

Designed for

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

You Will Learn

For conventional plays in onshore situations:

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

PCE-OUW-1			
Onshore Unconventional Well Completion Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 44 min	PCE-OCW-1

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

This PetroSkills PetroAcademy 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.

Designed for

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

You Will Learn

We will cover the following objectives in this course:

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

PCE-PRC-1			
Primary and Remedial Cementing Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 49 min	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 surrounding casing following a cementing job. Preliminary lab work to formulate primary cement blends is described. And, various methods are presented in the remedial repair of poorly cemented zones which can lead to life of the well production problems. Several different cement squeeze techniques are explained and recommended practices are described.

Designed for

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

You Will Learn

- The manufacturing processes to blend composite materials that make up oilfield cement
- The various uses of additives to modify cement properties
- The cementing tools at the surface and downhole and the related cement displacement process to achieve a quality primary cement job to isolate a casing string
- The casing cement evaluation tools and methods to assess cement job quality
- The various practices that comprise options to attempt repair of primary cementing jobs that are referred to as cement squeeze operations
- How to calculate typical casing string cement volume requirements
- How to evaluate a cement bond log and make recommendations

Skill Module Content

- Oilfield Cement Properties, Additives and Composition
- Cementing Equipment, Practices and Displacement
- Primary Cementing Results – Evaluation, Special Cases and Pitfalls
- Remedial and Squeeze Cementing

PCE-PEC-1			
Perforating Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 27 min	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.

Designed for

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

You Will Learn

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

Skill Module Content

- Shaped Charge
- Perforating Safety
- Tubing Conveyed Perforating
- Underbalanced Perforating

PCE-RPJ-1			
Rod, PCP, Jet Pumps, and Plunger Lift Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 17 min	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.

Designed for

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

You Will Learn

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

Prerequisite

It is recommended that the learner have previous knowledge of basic Inflow and Outflow concepts and related NodalTM Analysis principles and applications. The "Production Principles Basics" module covers Inflow and Outflow at the basic competency level.

Skill Module Content

This module provides an overview of proven basic principles: to design rod pump, PCP pump, jet pump, and plunger lift artificial lift systems to optimize production and recovery. Each of these artificial lift types have specific operating characteristics that are available to apply to operate appropriate candidate wells. Each will be examined using theory, videos and animations, and exercises to study and evaluate when and how to select these differing artificial lift systems for unique completion conditions. Oil recovery and gas well de-watering principles using appropriate artificial lift systems are described. Conventional and unconventional reservoir applications are cited.

PCE-RRP-2			
Reciprocating Rod Pumps Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 18 min	PCE-RPJ-1

About the Skill Module

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. Different types of surface unit configuration geometries are presented and the positives and negative attributes of each are presented. The API rod string design method is reviewed and two rod string designs are then conducted as exercises. Rod pump completion design problems are worked which include the selection of several input variables. Rod string metallurgy options are discussed and both fiberglass rods and continuous rods are illustrated, again with positive and negative considerations of each. The setup, operation, and interpretation of the surface dynamometer data gathering tool and its overall information gathering function is worked in exercises. Throughout the module, rod pump optimization concepts are presented. And lastly, the importance of computer software programs in designing and optimizing rod pump operations to accommodate rod string loads and metallurgy and fluid inertia factors is emphasized.

Designed for

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

You Will Learn How To

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

Discipline: Production and Completion

PCE-GLE-1			
Gas Lift and ESP Pump Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 52 min	PCE-PEC-1

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

Designed for

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

Prerequisite

It is recommended that the learner have previous knowledge of basic Inflow and outflow concepts and related NodalTM Analysis* principles and applications. The Production Principles Basics module covers inflow and outflow at the basic competency level.

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

You Will Learn

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

PCE-GLF-2			
Gas Lift Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	6 hrs 29 min	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.

Designed for

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

You Will Learn

How To

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

PCE-ESP-2			
Electrical Submersible Pumps Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	6 hrs	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.

Designed for

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

You Will Learn

How To

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

PCE-FDC-1			
Formation Damage and Matrix Stimulation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 36 min	PCE-PEC-1

This module clarifies from the outset that an unexpected loss of production following initial completion or a well intervention job is not always due to the same set of circumstances. Production not achieved when placing a new well on production may be a result of the original depositional environment that occurred. Or, it may be a result of drilling damage, dirty completion fluids or other phenomena that the engineer must properly identify to correct the production shortfall anomaly, if possible. Matrix acidizing chemistry is explained and the different steps taken when acidizing a limestone compared to a sandstone are explained. Related acidizing topics like diverting agents and their function, corrosion inhibitors, and well acidizing candidate selection are addressed.

Designed for

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

You Will Learn

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

PCE-FDF-2			
Formation Damage and Matrix Acidizing Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	9 hrs 40 min	PCE-FDC-1

About this Skill Module

The module addresses the complex oilfield phenomena that studies and attempts to resolve the varied causes of oil and gas production shortfalls. Production loss or less than expected production rate following initial completion or any well workover or intervention activity is often not only unexpected but also commercially penalizing as a result of lost production revenue. Formation damage is a term used to describe the cause of production loss. And, its use is a commonly misunderstood, misused, or distorted term. Production loss may be a result of many factors and circumstances, often either related or unrelated to one another, some due to natural depositional causes and others as a result of flawed or less than ideal operations conducted within the well to which the producing zone is exposed. The set of circumstances referred to as “True” Formation Damage is described in detail. It is demonstrated that production loss caused by these circumstances may often be remediated, as long as causes are properly defined and correct, and appropriate remedial steps are taken with specific attention to detail. Other causes of production shortfall, also grouped into the formation damage term to describe lost production, are identified in the module along with recommended remedial steps to address them. Use of the reservoir engineering term “skin” is explained and quantified in the module. Skin is described as the sum of related unwanted, individual pressure drops in a producing system that cause lost or reduced production. Once production loss causes are properly identified, certain types of causes may be resolved and production restored using principles of matrix acidizing and surfactant chemistry, acid job pumped at pressure below formation fracture pressure. Acid pumping schedules with related surface active agent chemical substances which react certain sources of formation damage are explained; related acidizing options and practices within an acid pumping schedule are developed. Oil and gas reservoirs most susceptible to formation damage that may be remediated are sandstones and limestone. Acid stimulation of both are described in detail. The complex reactions that take place using a Hydrofluoric acid / Hydrochloric acid on sandstones (referred to as “Mud Acid”) to remove production loss causing damage are described in detail. And, these are compared to the lesser complex use of Hydrochloric acid to react limestones to remove production loss causing damage. Fracture acidizing of limestones by pumping acid above fracture pressure are explained and examples illustrated. Corrosion inhibition, acid additives, iron control acid diversion, and related important topics are addressed and explained. A classic oilfield service company video explaining formation damage and acidizing is available to view. Several practical exercises are worked to illustrate key module principles.

Designed for

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

You will Learn

How To

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

PCE-FAP-1			
Flow Assurance and Production Chemistry Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 50 min	PCE-FDC-1

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

Designed for

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

You Will Learn

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

Skill Module Content

- Paraffins and Asphaltenes
- Inorganic Oilfield Scales
- Oilfield Corrosion
- Gas Hydrates

PCE-SCC-1			
Sand Control Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 50 min	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.

Designed for

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

You Will Learn

How To

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

Skill Module Content

- Sand Control Completion Options and Design
- Non-Gravel Pack Completions, Options, and Design Alternatives
- Gravel Pack Completions, Options, and Design Alternatives
- Frac Pack for Sand Control
- Expandable Sand Screens

PCE-SCF-2			
Sand Control Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	6 hrs 36 min	PCE-SCC-1

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

Designed for

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

You Will Learn How To

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

PCE-HFC-1			
Hydraulic Fracturing Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 57 min	PCE-FDC-1

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

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

Designed for

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

You Will Learn How To

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

Discipline: Production and Completion

PCE-PPD-1				PCE-PLC-1			
Production Problem Diagnosis Core				Production Logging Core			
STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 1 min	PCE-FDC-1	Released	Core	3 hrs 12 min	PCE-PPD-1

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

Designed for

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

You Will Learn

How To

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

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

Designed for

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers, as an introduction to Production Logging within the frame of a production engineering curriculum.

You Will Learn

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

Prerequisite

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

Skill Module Content

This module describes the principles of wireline-run cased hole logging tools. Included in the family of production logging devices are flowmeters, high-resolution thermometers, gradiomanometers, and through-tubing calipers. To evaluate downhole flowrates, these instruments enable recording of hole sizes, temperature and flow rate profiles. Accurate depth control is ensured by gamma ray logs and counting casing collars.

PCE-PLF-2			
Production Logging Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	6 hrs 15 min	PCE-PLC-1

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

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

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

Designed for

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

You Will Learn

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

Prerequisite

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

Skill Module Content

This module specifically describes the interpretation methods in single and multiphase flow, and the potential to diagnose possible anomalies downhole, before further action is decided.

PCE-DEC-1			
Design Process for Completion and Workovers Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 25 min	

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

Designed for

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

You Will Learn

How To

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

Discipline: Production and Completion

PCE-DEF-2				PCE-WCF-2			
Completion Design Fundamentals				**Well Completions Fundamentals**			
STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	10 hrs 18 min		Released	Fundamentals	9 hrs 22 min	

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

Designed for

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

You Will Learn How To

- Recognize the various design concepts which will be covered throughout the 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

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

Designed for

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

You Will Learn How To

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

PCE-WIC-1			
Well Intervention Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 55 min	

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, and entering a "live" well.

Designed for

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

You Will Learn

How To

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

PCE-WOF-2			
Workover Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 50 min	

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.

Designed for

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

You Will Learn

How To

- Explain the differences between a workover and intervention
- Provide examples of simple interventions
- Understand the purpose behind and importance of conducting workovers
- Identify the three general steps of a workover
- Identify tools used to recognize if well problems 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

PCE-TRP-1			
The Role of Production Technology Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	1 hrs 55 min	

Any oil and gas operation has certain key, fundamental aspects and "things that must happen" for the producing asset to be properly developed or re-developed initially and to continue to perform at its optimum efficiency and profitability throughout its life.

Well-defined practices and processes must be put in place. The project team and its cumulative skill set necessary to conceive and execute what must happen are essential and indispensable for any oil and gas industry organization.

This 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.

Designed for

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

You Will Learn

How To

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

PCE-PTA-1			
Production Technology Applications Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 59 min	

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

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

Designed for

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

You Will Learn

How To

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

PCE-NAW-3			
Nodal Analysis Workshop			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Workshop	30 hrs 34 min	PCE-WPN-2

This workshop will be delivered through PetroSkills PetroAcademy™ providing participants with the requisite knowledge they need through virtual delivery.

Well Inflow/ Outflow (NODAL™) Analysis is an integral part of a production or completion engineer's work scope, and it is often applied throughout a well's life to maximize value – from the beginning of the completion design process through underperforming well diagnostics. This workshop provides a comprehensive overview of this analysis 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 the analysis, identify sources of error, perform an analysis with industry software, and present a holistic recommendation. Topics related to perforating, components of skin, matching transient test data, outflow limitations, selecting artificial lift, liquid loading, and incorporating fluid PVT properties will be covered.

Designed for

Operating Company and Service Company Engineers, and Technical Managers, responsible for performing or reviewing well systems analysis from at least one perspective (perforating design, tubing sizing, post stimulation evaluation, etc.). Participants should be in a role that requires that they regularly perform or are required to technically review well inflow/outflow analysis.

You Will Learn

How To

- Recognize the application, and limitations, of traditional well systems analysis
- Identify data requirements for a meaningful analysis
- Accurately model the various components of skin, including perforating
- Assess outflow performance, including liquid loading, tubing constraints, and artificial lift
- Confidently approach well systems analysis from multiple perspectives, and select the correct diagnostic strategy for your well conditions

PCE-SIR-3			
Scale Identification, Remediation and Prevention Workshop			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Workshop	15 hrs 48 min	

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, and 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 subsequent deposition. Specific mathematical scale prediction methods are presented and numerous preventive methods, both chemical and unique approaches, are covered.

Designed for

Asset managers, drilling and completion engineers, petroleum engineers and geologists, independent producers, production managers and engineers, reservoir managers and engineers, field supervisors, company executives and officials, field personnel with operating and service companies. Participants should have at least one year of operations-related experience and be in a supervisory or support role.

You Will Learn

Participants will be able to recognize the importance of the various scales, appreciate the problems they create, understand how water, pressure, temperature and salinity affect scaling, and know various scale deposition mechanisms. Additionally, they will learn about:

- How to determine scaling potential and the solubility of various scales
- Two principle methods for scale identification and recognize various methods and their application for removing scale depending on its composition
- Precipitation tendency variables and locations for various scale deposits – especially iron and be familiar with three mathematical models that predict scaling, including a popular software program
- How to properly prevent and inhibit scale formation and deposition using various methods

Reservoir Engineering

RES-TRE-1				RES-RRP-1				RES-RRP-2			
This is Reservoir Engineering				**Reservoir Rock Properties Core**				**Reservoir Rock Properties Fundamentals**			
STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	1 hrs 20 min		Released	Core	2 hrs 50 min		Released	Fundamentals	7 hrs 40 min	RES-RRP-1
This skill module is an introduction to the blended version of the Applied Reservoir Engineering course. Designed for Subsurface technical professionals planning to take 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				This module reviews the properties of reservoir rocks at the most basic level. Designed for Reservoir engineers and geoscientists who need reconcile rock properties with their interpretations of the properties of the reservoir, drilling, production and completion engineers who need to recognize how rock properties affect their respective workflows. You Will Learn • Different types of rocks • Primary rock properties from a reservoir engineering point of view • How rock properties are measured • How rock property values are interpolated/extrapolated throughout the reservoir				This module introduces the concepts or wettability, capillary pressure and relative permeability, and discusses how they are measured and modeled for reservoir behavior description. Designed for Engineers and Geoscientists who need to understand how fluids compete for space in the reservoir. You Will Learn How To • Describe the concept of fluid contacts • Describe how saturations change when crossing contacts • Describe wettability • Describe interfacial tension • Describe how residual oil saturation is controlled by the interplay of different forces • Define capillary pressure • Explain how capillary pressure is a combination of several related phenomena • Describe how capillary pressure can be used to explain macroscopic reservoir phenomena • Show how collecting capillary pressure data can actually save money • Discuss the various choices available for measuring relative permeability in the laboratory • Discuss the various choices available for measuring capillary pressure in the laboratory • 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 54 min	

Reservoir Fluid Core reviews fluid properties at the most basic competency level.

Designed for

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

You Will Learn

How To

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

RES-RFF-2			
Reservoir Fluid Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	9 hrs 35 min	

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.

Designed for

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

You Will Learn

How to 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	2 hrs 40 min	

This Reservoir Engineering 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.

Designed for

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

You Will Learn

- 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

RES-RFP-2			
Reservoir Flow Properties Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 35 min	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.

Designed for

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

You Will Learn How To

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

Discipline: Reservoir Engineering

RES-RMB-1				RES-RMB-2			
Reservoir Material Balance Core				**Reservoir Material Balance Fundamentals**			
STATUS	LEVEL	DURATION	PRE-REQ	STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 29 min		Released	Fundamentals	6 hrs 45 min	RES-RMB-1

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.

Designed for

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

You Will Learn

How To

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

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

Designed for

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

You Will Learn How To

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

Discipline: Reservoir Engineering

RES-RSA-1			
Decline Curve Analysis and Empirical Approaches Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 23 min	

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

Designed for

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

You Will Learn

How To

- Perform Basic Statistics
- Calculate Decline Curve Analysis
- Estimate Recovery Factors

RES-RSA-2			
Decline Curve Analysis and Empirical Approaches Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	10 hrs 15 min	RES-RSA-1

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

Designed for

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

You Will Learn

- Exponential, Hyperbolic, and Harmonic decline curve application
- Transient 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	5 hrs 15 min	

This module brings your attention to reserves management and the difference between resources and reserves at a core competency level.

Designed for

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

You Will Learn

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

RES-PTA-1			
Pressure Transient Analysis Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 40 min	

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.

Designed for

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

You Will Learn

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

RES-RTA-1			
Rate Transient Analysis Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 39 min	

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

Designed for

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

You Will Learn

- 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

RES-RFD-1			
Reservoir Fluid Displacement Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 18 min	

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

Designed for

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

You Will Learn

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

RES-RFD-2			
Reservoir Fluid Displacement Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	9 hrs 4 min	RES-RFD-1

This module covers the same topics as Reservoir Fluid Displacement Core but goes into greater detail on the topics:

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

Designed for

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

You Will Learn

How To

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

RES-EOR-1			
Enhanced Oil Recovery Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 27 min	

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.

Designed for

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

You Will Learn

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

RES-IOR-2			
Improved Oil Recovery Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	5 hrs 30 min	

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

Designed for

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

You Will Learn About

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

RES-RSI-1			
Reservoir Simulation Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 5 min	

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

Designed for

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

You Will Learn

How To

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

RES-RSC-1			
Reservoir Surveillance Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 25 min	

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

Designed for

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

You Will Learn

- A surveillance plan 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			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	9 hrs 35 min	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.

Designed for

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

You Will Learn

How To

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

RES-RMC-1			
Reservoir Management Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	6 hrs	

This module brings your attention to reservoir management at a core competency level.

Designed for

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

You Will Learn

How To

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

RES-RMF-2			
Reservoir Management Fundamentals			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Fundamentals	8 hrs 9 min	RES-RMC-1

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

Designed for

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

You Will Learn

How To

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

Well Construction/Drilling

WCD-CDW-3			
Casing Design Workshop			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Workshop	38 hrs 21 min	

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

Prerequisites:

- Casing Basics
- Casing Design Fundamentals

Designed for

This workshop is designed for engineers, site supervisors, superintendents and managers responsible for casing design and/or review of casing design for the full life cycle of the well including drilling, completion, production, well intervention and abandonment.

You Will Learn

- A casing design process applicable to all wells on a global basis
- The tri-axial casing design approach based on worst case possible combinations will ensure well integrity for the full life cycle of the well
- The extremes of temperature, pressure and environment will be addressed in bolt-on sessions to the workshop including geothermal, SAGD, HPHT, Deepwater, etc.

WCD-OCC-1			
Oilfield Casing Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	3 hrs 43 min	

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

In this module, you will study five topics:

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

Designed for

- Individuals interested in the basic use of casing in oil fields
- Members of an extended multidiscipline team

You Will Learn How To

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

WCD-CRO-1			
Casing Running Operations Core			
STATUS	LEVEL	DURATION	PRE-REQ
Released	Core	4 hrs 50 min	

Casing is pipe that goes into the wellbore. Casing stays in the well because the outside of the casing is cemented into the earth, providing wellbore integrity. In other words, the casing's primary purpose is to keep the wellbore from caving in or fracturing, to keep unwanted fluids from entering the wellbore, and to keep the desired fluids (hydrocarbons) from leaving the borehole at undesirable places.

In this module, you will study four topics:

- Handling Casing: This topic introduces the process of getting the casing to the rig floor. It explains the concept of stacking casing in reverse order, numbering casing, and the types of casing you will see at an oil rig.
- Rigging up Casing Running Equipment: This topic overviews the running casing checklist, Job Safety Analysis (JSA) and equipment used for setting casing in a borehole. It explains the purpose and function of spiders, elevators, power tongs, and the stabbing board.
- Making up the Shoe Track: This topic introduces the shoe track and some of the other pieces of a casing string. It explains the purpose of the float shoe, guide shoe, float collar, thread locking compound, and centralizers.
- Running Casing: This topic provides an in-depth explanation of running the casing into the borehole. It describes the "dance"—the set of steps and movements of the casing crew that help to get the casing in the borehole quickly, efficiently, and safely.

Designed For

- Individuals interested in the understanding what it takes to run casing
- Members of an extended multidiscipline team

You Will Learn How To:

- Describe the steps of running casing, from getting the casing to the rig to running the casing into the borehole
- Determine safe working practices while running casing on a rig
- Identify responsibilities of and organize all wellsite personnel for normal casing running operations
- Identify the purpose of the basic running casing equipment and key steps used to run casing