e-Learning Solutions

Detailed Course Catalog

- Oil & Gas Business
- Upstream Technology
- Operations & Maintenance
- Business Essentials

IHRDC

International Human Resources Development Corporation

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Oil & Gas Business

A comprehensive series of modules that provides in-depth industry overviews for each sector of the oil and gas industry, including Upstream Sector, Midstream Sector, and Downstream Sector. This series is suitable for anyone associated with or interested in the international oil and gas industry.

Upstream Technology

IHRDC's award-winning, comprehensive e-Learning system covers all areas of upstream petroleum technology. This is a corporate solution for building competencies of E&P professionals at all levels. Includes Petroleum Geology, Petroleum Geophysics, Petroleum Engineering, and Formation Evaluation.

Operations & Maintenance

O&M e-Learning is a comprehensive learning resource devoted to Process Operations, Maintenance, Control Systems and HSE. These courses ensure operators and technicians understand the relevant theories, plant processes, equipment and component operations that are necessary to drive efficiencies, promote safety, and achieve operational excellence.

Business Essentials

An interactive set of modular courses in key business areas – Finance, Communications, Human Resource Management, Project Management – designed to improve the critical business skills of individuals working in the international oil and gas industry.

IHRDC 50 years

Access and Licensing

All of IHRDC's e-Learning courses may be accessed from anywhere with an internet connection. We offer a variety of licensing options, from individual courses to corporate user-based arrangements. Please contact us at els.info@ihrdc.com for more information.

Certificates

IHRDC issues certificates to learners who have completed a course and related assessment with a passing score.

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International Human Resources Development Corporation

Oil & Gas Business

Petroleum Online

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Industry Overview

Oil & Gas Industry Overview

Description:

A comprehensive overview of the industry; learn what petroleum is, where it comes from and how it affects all of our lives on a daily basis. Become familiar with the various phases of the Oil and Gas Value Chain - upstream, midstream and downstream - the key industry players, the basics of oil and gas supply, demand and pricing and the challenges that the industry faces as demand for this important form of energy grows by 50% in the next 25 years.

Duration:

4 hours

Course Code:

IHRDC_PO_I1

Content:

After completing this module, you will be able to:

- Identify the definition of petroleum and natural gas
- Identify the basic concepts of oil and gas measurement
- Identify heating content and its price equivalence of oil, gas and coal
- Recall where petroleum comes from and how it affects all of our lives on a daily basis
- Identify the various phases of the Oil and Gas Value Chain - upstream, midstream and downstream
- Recognize the key industry players
- Identify the basics of oil and gas supply, demand and pricing and the challenges that the industry faces

Upstream Oil & Gas

Upstream Oil & Gas Agreements

Description:

Upstream agreements define the legal, business and working relationships that exist between companies that explore for and produce oil and gas, and the government agencies or private parties that own the mineral rights. Learn how oil and gas leases are negotiated with a landowner in the U.S. and analyze the two main forms of agreements, the Concession Agreement and the Production Sharing Contract, used by host countries around the world.

Duration:
2 hours

Course Code:
IHRDC_PO_I2

Content:

After completing this module, you will be able to:

- Recall the historical agreement process which evolved into the current forms of agreements
- Recognize Upstream agreements which define the legal, business and working relationships that exist between companies that explore for and produce oil and gas and the government agencies or private parties that own the mineral rights
- Identify how oil and gas leases are negotiated with a landowner in the US
- Identify the two major forms of agreements used by host countries – the Concession Agreement and the Production Sharing Contract

Petroleum Geology & The Exploration Process

Description:

Examine the geological conditions that make for a good petroleum prospect, and learn why oil and gas are found in some places and not others. Also learn the step-by-step process to identify projects, from the initial surface reconnaissance to the drilling of exploratory wells.

Duration:
3 hours

Course Code:
IHRDC_PO_I3

Content:

After completing this module, you will be able to:

- Identify the geological conditions that make for a good petroleum prospect
- Recall why oil and gas are found in some places and not others
- Recognize the step-by-step process that exploration teams follow to identify projects, from the initial surface reconnaissance to the drilling of exploratory wells

Upstream Oil & Gas

Drilling and Well Completions

Description:

Geological studies and seismic surveys can indicate an oil or gas prospect, but the only way to know if that prospect contains oil or gas is to drill wells. Get an introduction to the basics of the rotary drilling process and learn the dramatic advances in drilling technology that have taken place in recent years.

Duration:
2 hours

Course Code:
IHRDC_PO_I4

Content:

After completing this module, you will be able to:

- Identify the basics of the rotary drilling process
- Identify the steps of well planning and the design process
- Recognize the basics of well completion
- Recall the types of formation evaluation methods

Oilfield Development

Description:

The development and production of an oil or gas field is among the most involved and challenging business undertakings. Learn the steps involved in field development, from its initial planning stages, through reservoir analysis, subsurface design and construction of surface facilities. This course also covers components of long-term production, reservoir management and facilities maintenance.

Duration:
5.8 hours

Course Code:
IHRDC_PO_I5

Content:

After completing this module, you will be able to:

- Identify the complex and challenging business process involved in the development and production of an oil or gas field
- Recall the steps involved in field development, from its initial planning stages, through reservoir analysis, subsurface design, construction of surface facilities, long-term production, reservoir management, and facilities maintenance
- Identify the business drivers that help determine field development potential

Gasfield Development and Wholesale Markets

Description:

This course provides an overview of the significant gas properties and the units that are used to measure and sell natural gas. It demonstrates how a gas prospect is discovered and developed into a viable producing entity. Topics include estimating resources and reserves, field design process and surfaces facilities required to satisfy gas market specifications, and delivering gas to markets. It ends with a summary of the nature of the wholesale gas and gas liquids markets - power, petrochemicals, gas-to liquids - in various countries, and typical wholesale gas sales agreements.

Duration:
2 hours

Course Code:
IHRDC_PO_I13

Content:

- Overview
- Basic Gas and Gas Liquid Properties and Terminology
- Gas Industry Value Chain with Emphasis on the Upstream Sector
- Upstream Petroleum Project Management Stages and Workflow
- Background on Two Gas Exploration Prospects
- Exploration of Gas Prospects
- Planning Gas Field Development
- Development of New Discoveries
- Managing the Production Cycle
- Summary of Case Studies and Drivers of Upstream Gas Success
- References

Marketing and Trading of Crude Oil

Description:

Like other commodities, the market determines the value of crude oil. Examine how crude oil markets and pricing are established based on global and regional supply and demand, and how organizations such as OPEC affect these markets on a wholesale level.

Duration:
4 hours

Course Code:
IHRDC_PO_I6

Content:

After completing this module, you will be able to:

- Identify how crude oil markets and pricing are established based on global and regional supply and demand
- Identify how organizations such as OPEC affect these markets
- Identify how crude oil is sold and traded at the wholesale level
- Recognize the strategies to manage oil price risks

Midstream Oil & Gas

Crude Oil Transportation & Storage

Description:

Every day, some 85 million barrels of crude oil are transported from producing fields to major refining centers, many of which are located hundreds or thousands of miles apart. Learn how, and at what cost, crude oil is transported in pipelines and tankers - the two most practical and economical methods for moving large volumes of crude oil over long distances.

Duration:
2.6 hours

Course Code:
IHRDC_PO_I7

Content:

After completing this module, you will be able to:

- Recognize how crude oil is transported from producing fields to major refining centers, many of which are located hundreds or thousands of miles apart
- Identify how, and at what cost, crude oil is transported in pipelines and tankers - the two most practical and economical methods for moving large volumes of crude oil over long distances
- Identify the reasons and benefits of each crude oil storage facility

Gas Processing and NGL Markets

Description:

This course offers an overview of the expanding gas processing sector, which has been impacted by the rapid development of unconventional gas. It explains how rich natural gas is first separated into methane and NGL and transported to fractionation plants, where it is separated into ethane, LPGs (propane and butanes) and natural gasoline. Special attention is given to the various uses for these liquid hydrocarbons, the market prices and economics of various rich gas streams when separated and marketed into individual components and their historical international market supply-demand and pricing profiles.

Duration:
2.3 hours

Course Code:
IHRDC_PO_I14

Content:

After completing this module, you will be able to:

- Recall how rich natural gas is first separated into methane and NGL, then how NGL is transported to fractionation plants
- Recall the various products of NGL as a result of fractionation
- Calculate the market value of dry and rich gases
- Identify the uses of liquid hydrocarbons, their market prices, frac spread, and historical trends of supply and demand internationally
- Identify the types of Midstream Service contracts

LNG Value Chain and Markets

Description:

This course covers the LNG value chain, from gas supply to liquefaction, ship transportation and receiving/regasification terminals, and the processes/facilities required in each sector. The economics of a special LNG case study are presented to show the typical economics of a project. You will learn the price that must be charged for LNG delivered into a distant market, considering capital and operating costs and the impact of the revenues received for the hydrocarbon liquids produced and sold with the gas. The course also contains a summary of the historical LNG market development, including the major exporters and importers, and the various regional market prices of LNG.

Duration:
1.5 hours

Course Code:
IHRDC_PO_I15

Content:

After completing this module, you will be able to:

- Recognize LNG, its measurement and calculate its conversion to gas equivalent
- Identify the processes/facilities required in each sector of the LNG value chain
- Identify the economics of an LNG project and the global LNG markets
- Recall the regions in the world where the highest volume of market trade occurs

Load Balancing including Underground Gas Storage

Description:

This course explains how the market demand for natural gas changes by the hour, day, month and season and discusses the characteristics of the various **load balancing** options that are available to manage these **load swings**. Each of these options - underground storage (pore and cavern storage facilities), linepack, interruptible service and LNG peak shaving - is discussed in detail including operating characteristics and cost of service. Then the manner in which an actual gas distribution company designed a load balancing system to manage its gas swings is presented as an illustration.

Duration:
2.8 hours

Course Code:
IHRDC_PO_I17

Content:

After completing this module, you will be able to:

- Recall the fundamentals of load balancing for managing load swings.
- Recognize how pipeline and field production are most effectively used for load balancing.
- Define the options, advantages and disadvantages of using LNG for load balancing.
- Recall how interruptible customers can be used for load balancing.
- List the types of UGS facilities used for load balancing and their characteristics.
- Identify the optimal load balancing options for managing seasonal load swings.

Midstream Oil & Gas

Refining & Product Specifications

Description:

Crude oil, like other raw materials, has few practical uses in and of itself. Its value lies in the products that can be extracted from it. Learn how crude oil is processed into commercial products through various refining processes. Also explore why some refineries are more complex than others and what business decisions go into each day's refinery run.

Duration:
4 hours

Course Code:
IHRDC_PO_I8

Content:

After completing this module, you will be able to:

- Recognize the importance of crude oil density (API) and quality (sulfur content)
- Recall the products that can be extracted and created from crude oil
- Recognize the value of the products that can be extracted and created from crude oil
- Identify how crude oil is processed into commercial products through various refining processes
- Identify why some refineries are more complex than others
- Identify the factors that affect refining margins and how they influence business decisions
- Identify the HSE issues which helped define safety regulations

Overview of Petrochemicals

Description:

Petrochemicals, which are derived from crude oil and natural gas, add a unique dimension to the Oil and Gas Value Chain. Learn how oil and gas feedstocks are converted into petrochemical products ranging from fertilizers to plastics, and from clothing to pharmaceuticals. The course also covers the economics of petrochemical plants and examines the success of a petrochemical plant in Trinidad.

Duration:
2.3 hours

Course Code:
IHRDC_PO_I11

Content:

After completing this module, you will be able to:

- Identify petrochemicals and their value within the oil and gas value chain
- Recall the seven basic petrochemical building blocks and the typical products that are created using oil and gas feedstocks
- Identify the business drivers that influence the economics of petrochemical plants
- Recognize the profitability cycles of petrochemical companies

Downstream Oil & Gas

Marketing & Distribution of Petroleum Products

Description:

Once crude oil has been refined into transportation fuels, heating oil, lubricants and other products, it must be marketed and distributed to commercial and retail customers. In this course you will learn how refined products make their way to pipelines, terminals, service stations and other outlets where the profits are being made in this downstream sector of the industry, and the economics of the modern gasoline super-station.

Duration:

4.7 hours

Course Code:

IHRDC_PO_I9

Content:

After completing this module, you will be able to:

- Recall the products that are created using crude oil
- Identify how petroleum products are marketed and distributed to commercial and retail customers
- Identify how refined products make their way to pipelines, terminals, service stations and other outlets
- Recognize where the profits are being made in this downstream sector of the industry
- Identify the economics of the modern gasoline super-station
- Recognize the HSE considerations along this sector of the oil value chain

Gas Distribution, Marketing & Trading

Description:

This course covers the downstream gas value chain including gas distribution, the characteristics of the key international gas markets, and the manner in which gas supply is managed and sold into the retail market. It describes the design of a typical gas distribution system, the services it provides, typical distribution tariffs, and billing structure. Gas markets discussed include residential, commercial, industrial, power generation, vehicle fuel. Gas marketing and trading is introduced through the strategy that a "typical" gas distribution company follows in managing its gas supply in an "open access" gas industry environment.

Duration:

2 hours

Course Code:

IHRDC_PO_I10

Content:

- Overview
- Gas Distribution
- Gas Distribution Markets
- Gas Trading
- Summary
- References

Business Games

Oil Industry Business Game

Description:
Nicola, a dynamic Business Simulation Game, is used to integrate the subject matter of each course to recreate the challenge of discovering, producing, and marketing oil and gas to learn where value, in the form of financial performance, is created along the value chain.

Duration:
2 hours

Course Code:
IHRDC_PO_I12

Gas Industry Business Game

Description:
Nicola, a dynamic Business Simulation Game, is used to integrate the subject matter of each course to recreate the challenge of discovering, producing, and marketing oil and gas to learn where value, in the form of financial performance, is created along the value chain.

Duration:
2 hours

Course Code:
IHRDC_PO_I18

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Upstream Technology

IPIMS

Course Catalog

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International Human Resources Development Corporation

IPIMS Background Learning

Upstream Technology e-Learning

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Other Petroleum Engineering Topics

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Well Logging

Well Testing and Analysis

Rock and Fluid Sampling and Analysis

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Unconventionals

PETROLEUM GEOLOGY: Introduction and Overview

Fundamentals of Petroleum Geology

Description:

The same basic fundamentals for hydrocarbon accumulation apply for small accumulations as they do for large accumulations, and those basic principles should always be applied. However, hydrocarbon exploration has become more challenging as larger discoveries are less prolific and smaller accumulations, as well as unconventional resources, require more technological advancements in order to be economically feasible. Due to these challenges, it is essential to discover and evaluate new methods and standards in petroleum geology. This topic explores these methods and standards, such as the classification of different basin types and the requirements involved with the five phases of hydrocarbon exploration. This topic further evaluates the processes involved with maturation, the categorization of organic matter and how it relates to the anticipated hydrocarbon type, and the migration of hydrocarbons and their relationship to porosity and permeability of different rock types. Types of trapping mechanisms involved with hydrocarbon accumulation and both technical and economic risks involved in petroleum geology are also identified. By exploring these methods and standards, perhaps future challenges and risks can be minimized in the field of petroleum exploration.

Duration:
1 hour

Course Code:
IHRDC_IPIMS_t38098

Content:

- Petroleum Exploration Overview
- Petroleum Generation and Maturation
- Migration and Accumulation Processes

Hydrocarbon Properties

Description:

This topic reviews the characteristics and categorizations of gas, as well as the properties, classifications, and alterations of crude oil. It includes the differences between non-hydrocarbon and hydrocarbon gases, and explores gas hydrates. Physical properties, chemical properties, and varying composition of crude oil are presented, and how these three elements can have both positive and negative effects on petroleum exploration are also explored. This topic also evaluates a typical classification scheme of the occurrence of crude oils.

Duration:
40 minutes

Course Code:
IHRDC_IPIMS_t37993

Content:

- Gas Properties and Classifications
- Crude Oil Properties, Classifications, and Alterations

PETROLEUM GEOLOGY: Introduction and Overview

Subsurface Environment

Description:
This topic addresses the fundamental and general conditions of the subsurface environment. The nature of water, pressure, geothermal gradient and fluid dynamics is discussed and its implications on oil and gas generation. Also presented is the effects of overpressure and under pressured environments as it relates to drilling and production.

Duration:
2 hours 30 minutes

Course Code:
IHRDC_IPIMS_t38405

Content:

- Water Origins and Chemistry
- Temperature and Thermal Gradient
- Pressure Environments

Reservoirs

Description:
This topic defines porosity and describes its different types as they relate to reservoir quality. It defines permeability and explains how it is determined in a laboratory setting. The course summarizes the different elements associated with rock texture and describes how those elements affect the porosity and permeability of a reservoir. It explains how capillary pressure affects the overall quality of a reservoir. The four sandstone burial factors that affect porosity and permeability and the three main cementation types that degrade porosity in sandstones are described. The course explains the ways in which porosity can be degraded in limestones and dolomites. It identifies the rocks that typically form atypical reservoirs and how porosity primarily occurs in these reservoirs. The differences between pay, net pay and gross pay, and how reservoir formations can affect these calculations are described. The five different types of reservoir shapes associated with areal continuity and the different types of reservoir orientations associated with cross-sectional continuity are explained. The course describes how to calculate a reservoir's initial oil and gas in-place volume using basic inputs and equations.

Duration:
2 hour 22 minutes

Course Code:
IHRDC_IPIMS_t39599

Content:

- Rock Properties
- Diagenesis
- Reservoir Continuity and Hydrocarbon Volume Calculations

PETROLEUM GEOLOGY: Introduction and Overview

Hydrocarbon Generation and Migration

Description:

This topic outlines the depth, temperature and time effects on the generation of hydrocarbons. It discusses the ways we can use source rock minerals to determine paleotemperature, and explains how to identify the various kerogen types and unique chemistries on Van Krevelen plots. Kerogen types, their origins, components and ability to generate hydrocarbons are discussed. The three important stages in the burial and evolution of organic matter into hydrocarbons are described. The topic outlines the two nonaqueous models in primary migration and lists the three main factors involved in secondary migration. It identifies the conditions under which secondary migration generally occurs and gives examples of the range of distances. Two ways that the solubility of hydrocarbon in water can be enhanced are outlined and it describes the distinction between primary and secondary migration.

Duration:
2 hours 19 minutes

Course Code:
IHRDC_IPIMS_t39285

Content:

- Generation and Maturation Processes
- Migration Processes

Hydrocarbon Traps

Description:

This course explains the importance of hydrocarbon traps in petroleum exploration, describes the major types of hydrocarbon traps and lists the components of a hydrocarbon trap. The differences between structural and stratigraphic traps are defined, and it explains how structural traps are created. The three different kinds of fold traps are described and the twelve differences between compactional and compressional fold traps are outlined. The four development stages of growth faults are defined and the principal trap for oil and gas in growth faults is identified. It lists the nine different types of stratigraphic traps, explains the variations in lithology that form depositional traps, and describes the geologic environments in which diagenetic traps form. The course defines several geologic environments in which traps form adjacent to unconformities. Hydrodynamic traps are described, and the trapping mechanisms of combination traps are listed. It describes the ways that oil can be trapped by salt domes and identifies two situations that can generate salt movement. Trapping mechanisms in shale reservoirs are also discussed.

Duration:
2 hour 40 minutes

Course Code:
IHRDC_IPIMS_t39807

Content:

- Introduction to Hydrocarbon Traps
- Structural Traps
- Stratigraphic Traps
- Other Trap Types

PETROLEUM GEOLOGY: Introduction and Overview

Habitat of Hydrocarbons in Sedimentary Basins

Description:

Provides the format for genetic classification of sedimentary basins, drawing together the principles of the previous six modules into the evaluation of the earth's plate tectonic framework. Explains identification and classification of sedimentary basins, their role in forming oil and gas, and the habitats of oil and gas within them.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t36

Content:

- Sedimentary Basins: Overview
- Cratonic Basins
- Divergent Margin Basins
- Convergent Margin Basins
- Downwarp Basins and Tertiary Deltas
- Petroleum Characteristics by Basin Type
- Basin Types: Review Exercises
- Habitat of Hydrocarbons in Sedimentary Basins: References and Additional Information

PETROLEUM GEOLOGY: Basic Skills of the Petroleum Geologist

Geologic Cross-Sections

Description:
Teaches the construction of the two principal types of cross sections--structural and stratigraphic--and their extensions into three-dimensional (fence) diagrams. Introduces computer generation of maps and sections.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t37

Content:

- Cross-Section Elements
- Cross-Sections in Two Dimensions
- Cross-Section Diagrams in Three-Dimensions
- Cross-Sections: Computer Methods
- Structural Restoration: Concepts and Timing
- Geologic Cross-Sections: References and Additional Information

Subsurface Mapping

Description:
An integrated approach to subsurface mapping, discussing downhole data, correlations between wells, and how to depict surfaces and three-dimensional units on contour maps. Presents surface maps and geophysical or remote sensing surveys as aids in delimiting important structural and stratigraphic relationships. Stresses proper correlation and use of borehole information.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t38

Content:

- Lateral Correlation of Logged Data
- Structural Contour Maps
- Isopach and Other Subsurface Maps
- Paleo-Structure Maps
- Subsurface Mapping: References and Additional Information

PETROLEUM GEOLOGY: Basic Skills of the Petroleum Geologist

Prospect Generation

Description:

Teaches how prospects are generated, emphasizing recognition of previously undelineated anomalies, and that although each prospect is unique, the general patterns of prospect generation are roughly similar. Presents learning basic patterns by using the experience of others and reviewing past cases.

Duration:

1 hour 20 minutes

Course Code:

IHRDC_IPIMS_t39

Content:

- Prospect Generation: Basic Concepts and Definitions
- Prospect Generation in Frontier Regions
- Model Prospects
- Prospect Generation: References and Additional Information

PETROLEUM GEOLOGY: Reservoir Geology

Nonmarine Sandstone Reservoirs

Description:
Presents basic concepts and techniques of exploration for nonmarine sandstone reservoirs. Applies common tools for examining nonmarine settings--such as rivers, desert dunes and lakes-- in terms of their genesis and recognition in the subsurface.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t49

Content:

- Classification of Nonmarine Sandstones
- Alluvial Fan Environments
- Braided Stream Environments
- Meandering Channel Alluvial Systems
- Eolian Environments
- Lacustrine Environments
- Exercises: Identifying Reservoir Environments
- Nonmarine Sandstone Reservoirs: References and Additional Information

Shelf Marine Sandstone Reservoirs

Description:
Describes characteristics of shelf sand reservoirs, including elongate submarine fans, radial submarine fans and slope-apron systems. Presents detection methods including seismic, well-log, core analysis, paleontology and production studies.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t51

Content:

- Introduction to Shelf Marine Sandstone Reservoirs
- Depositional Processes of Shelf Sands
- Shelf Sand Deposits
- Diagnosis and Detection of Shelf Sands
- Petroleum Geology, Reservoir Characteristics
- Shelf Marine Sandstone Reservoirs: References and Additional Information

PETROLEUM GEOLOGY: Reservoir Geology

Marginal Marine Sandstone Reservoirs

Description:
Examines coastal barrier islands, shallow-marine shoals, bars and deltas, presenting depositional and erosional conditions dominant during formation. Describes diagnosis and recognition through use of seismic, well-log, map and core data.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t50

Content:

- Introduction to Marginal Marine Sandstone Reservoirs
- Deltaic Environments
- Barrier Islands
- Marginal Marine Sandstone Reservoirs: References and Additional Information

Deepwater Marine Sandstone Reservoirs

Description:
Describes characteristics of deepwater sand reservoirs, including elongate submarine fans, radial submarine fans and slope-apron systems. Presents detection methods including seismic, well-log, core analysis, paleontology and production studies.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t2613

Content:

- Introduction to Deepwater Marine Sandstone Reservoirs
- Sedimentation Processes
- Depositional Systems
- Subsurface Diagnosis and Detection
- Sequence Stratigraphy
- Petroleum Geology and Reservoir Characteristics
- Deepwater Marine Sandstone Reservoirs: References and Additional Information

PETROLEUM GEOLOGY: Reservoir Geology

Porosity Evolution in Sandstone Reservoirs

Description:
Describes porosity evolution in all sandstone reservoirs, regardless of depositional environment, and reviews factors that control primary and secondary porosity. Evaluates tools and techniques used for description of sandstone porosity and porosity evolution. Illustrates applications of porosity evolution through case studies.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t52

Content:

- Description of Sandstone Porosity
- Diagenesis
- Secondary Porosity
- Evaluation Tools and Techniques
- EandP Applications
- Case Studies
- Porosity Evolution in Sandstone Reservoirs: References and Additional Information

Exploration in Carbonate Rocks

Description:
Introduces carbonates by examining formation and deposition, focusing on ramp and slope models and the depositional settings within them. Presents field examples of ancient and modern carbonate deposits and their reservoir characteristics.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t53

Content:

- Introduction to Exploration in Carbonate Rocks
- Carbonate Rocks Described
- Analysis of Carbonate Rocks and Facies Distribution
- Nonmarine Carbonate Settings
- Coastal Setting
- Shelf Setting
- Shelf-Margin Setting
- Foreslope Setting
- Basinal Setting
- Exploration in Carbonate Rocks: References and Additional Information

PETROLEUM GEOLOGY: Reservoir Geology

Porosity Evolution in Carbonate Rocks

Description:
Demonstrates the systematic evolution of carbonate porosity and describes classifications and conditions used for predicting porosity distribution. Discusses depositional and diagenetic models of carbonates. Field studies illustrate how to handle porosity parameters in production planning.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t54

Content:

- Introduction to Porosity Evolution in Carbonate Rocks
- Diagenesis and Porosity Evolution
- Evaluation of Porosity and Diagenetic History
- Porosity Evolution and Petroleum Exploration
- Porosity Evolution and Field Development
- Porosity Evolution in Carbonate Rocks: Reference Section

Evaporites and their Role in Petroleum Exploration

Description:
Describes characteristics of evaporites and examines their relationship to hydrocarbon accumulations, including their role as source beds, reservoirs, traps and seals. Discusses evaporite mineralogy and diagenesis, as well as analysis and identification techniques. Field examples illustrate occurrences, evaluation and significance of evaporite structures.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t55

Content:

- Introduction to Evaporites and their Role in Petroleum Exploration
- Sabkha Depositional Facies and Reservoirs
- Subaqueous Evaporites
- Ancient Depositional Models
- Salt Structures, Sediments and Hydrocarbons
- Evaporite/Dolomite/Hydrocarbon Association
- Evaporites and their Role in Petroleum Exploration: References and Addition

PETROLEUM GEOLOGY: Reservoir Geology

Basic Geostatistics

Description:

This presentation describes both classical statistical and geostatistical methodologies designed to quantify qualitative information. Though the material presented is not heavily mathematical, the presentation is not simplistic. General equations and matrix notation are used in some sections. The equations are presented mostly for informational purposes, because calculations used in geostatistics tend to be tedious and very computer-intensive. This module presents an overview of techniques that can be used to transform a traditional geological reservoir description (a surface or 3D volume) into a mathematical reservoir.

Duration:

3 hours 40 minutes

Course Code:

IHRDC_IPIMS_t23340

Content:

- Introduction to Basic Geostatistics
- Classical Statistical Concepts
- Data Posting and Validation
- Regionalized Variables
- Kriging
- Data Integration
- Conditional Simulation
- Public Domain Geostatistics Programs
- Case Studies
- Selected Readings
- Geostatistics Glossary

PETROLEUM GEOLOGY: Sedimentology and Stratigraphy

Subsurface Facies Analysis

Description:

Reviews basic parameters in defining a facies--lithology, sedimentary structures, paleontology, geometry and associated environments. Discusses information sources, including cores, cuttings, well logs and seismic, and summarizes diagnostic features of major facies. Presents case studies on environmental diagnosis of productive sandstone and carbonate reservoirs.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t48

Content:

- Sedimentary Environments and Facies
- Lithology
- Sedimentary Structures, Geometry and Facies
- Microfossils as Paleoenviromental Indicators
- Sources of Information
- Sandstone Reservoir Facies
- Carbonate Reservoir Facies
- Subsurface Facies Analysis: References and Additional Information

Classic Sequence Stratigraphy

Description:

Reviews a typical stratigraphic sequence, and examines each of its component systems tracts. Stresses the interplay between sea level and sediment supply and how this interplay affects depositional geometries. Presents a methodology for interpreting stratigraphic sequences, incorporating well, seismic and biostratigraphic data. Discusses current controversies and future trends.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t56

Content:

- General Concepts
- Cyclostratigraphy
- The Making of a Stratigraphic Sequence
- Sequence Stratigraphy
- Interpretation of Stratigraphic Sequences
- Conclusions and Current Controversies
- Sequence Stratigraphy: References and Additional Information

PETROLEUM GEOLOGY: Sedimentology and Stratigraphy

Stratigraphic Disciplines and Sequence Stratigraphy

Description:

Since its inception, sequence stratigraphy has become the most commonly used stratigraphic discipline for developing a basinwide correlation framework, yet aspects of its methods and terminology remain controversial. This topic reviews the history and examines the models of base-level change that underlie the concept. The key surfaces (material- and time-based) and the units they delineate (sequences, systems tracts, and parasequences) are explained and exemplified. Hierarchy and causality are discussed in relation to eustacy and tectonics. Sequence stratigraphic principles are applied to correlation and facies analysis in the context of petroleum exploration. The perspective is that of Dr. Ashton Embry.

Duration:
4 hours 20 minutes

Course Code:
IHRDC_IPIMS_t37151

Content:

- Introduction to Stratigraphic Disciplines and Sequence Stratigraphy
- Historical Development of Sequence Stratigraphic Concepts and Methods
- Material-based Surfaces of Sequence Stratigraphy
- Base Level Change Model for the Generation of Sequence Stratigraphic Surfaces
- Time-Based Surfaces of Sequence Stratigraphy
- Units of Sequence Stratigraphy - Sequences
- Units of Sequence Stratigraphy - Systems Tracts
- Units of Sequence Stratigraphy - Parasequences
- Sequence Boundary Hierarchy
- Base Level Drivers
- Correlation with Sequence Stratigraphy
- Sequence Stratigraphy - Facies Analysis Applied to Petroleum Geology
- Sequence Stratigraphy: References and Additional Information

Micropaleontology for Petroleum Exploration

Description:

Introduces the disciplines of micropaleontology, biostratigraphy, paleoecologic analysis, and chronostratigraphy, developing basic concepts together with the essential vocabulary for working with specialists in those fields. Provides examples to demonstrate the practical applications of micropaleontology to petroleum exploration and development.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t36879

Content:

- Overview
- Modern Paleontology
- Petroleum and microfossils
- Biofacies

PETROLEUM GEOLOGY: Sedimentology and Stratigraphy

Chronostratigraphy and Microfossils

Description:

Describes the classification, collection, preparation and presentation of microfossil data in the context of petroleum exploration and development. Introduces chronostratigraphy as the study of relative time relations and ages of rock bodies, and examines the development of geologic time scales. Discusses the role of isotopic analysis in understanding climate changes over time and in developing paleoceanographic reconstructions.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t36880

Content:

- Microfossil Datasheets
- Microfossil Collection and Preparation Techniques
- Chronostratigraphy and Geochronology
- Chronostratigraphy

Chemostratigraphy

Description:

One of the main advantages of chemostratigraphy is its utility with strata of almost any age from any geological setting as diverse as carbonate platforms to tidal bar sandstones to deep marine turbidites. Chemostratigraphy is not restricted by lithology or sample type. It can be applied to samples of any lithology (including but not restricted to claystones, sandstones, volcaniclastics, coals, carbonates and evaporites) and equally as well in core, side wall, outcrop and well cutting samples, including turbine- drilled cuttings. Analyses can also be performed on a small amount of sample (minimum of 0.25 grams) where sample volumes are limited. The sample quality is most important, especially in well cuttings, so initial preparation involves "picking" the desired lithology and washing to remove drilling fluid contamination prior to grinding and milling.

Duration:

1 hour

Course Code:

IHRDC_IPIMS_t37415

Content:

- Analytical techniques for Chemical Properties of Strata
- Chemostratigraphic Correlation Frameworks
- Characterization of Sedimentary Sequences

PETROLEUM GEOLOGY: Sedimentology and Stratigraphy

Ongoing Development in Biostratigraphy

Description:
Discusses the specific role of biostratigraphy in sequence stratigraphic analysis. Introduces the essential elements of sequence biostratigraphy (unconformities, sequences and condensed sections) and looks at tools and methods for examining them. Lists considerations involved in selecting a biostratigraphic consultant.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t36881

Content:

- Sequence Biostratigraphy
- Thermal Alteration Microfossiles
- Consultants Reports

Magnetostratigraphy

Description:
Introduces the branch of paleomagnetism that focuses on the polarity history of Earth's ancient magnetic field, and discusses the theory, magnetic mineralogy, field and laboratory equipment, field techniques, laboratory techniques, practical applications and other aspects that serve as valuable tools in hydrocarbon exploration.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t37005

Content:

- Fundamentals of Magnetostratigraphy
- Magnetic Domains
- Field Methods
- Types of Analytical Equipment

PETROLEUM GEOLOGY: Sedimentology and Stratigraphy

Geochronological Dating Techniques

Description:

One of the most prolific methods of dating strata is through radiometric dating. In Petroleum Geology, the most common types of dating are those related to the decay of Potassium into Argon, Uranium, into Lead, and Thorium into Lead. All three types of decays are discussed, and the user will have a better understanding of the age equations used in radio dating. The user will also learn about Fission Track Dating, a tool that is used to determine both age and temperature of downhole conditions.

Duration:

1 hour

Course Code:

IHRDC_IPIMS_t37181

Content:

- Isotopic Dating Techniques
- Fission Track Dating

PETROLEUM GEOLOGY: Structure, Tectonics and Rock Deformation

Petroleum Geomechanics

Description:

Introduces geoscientists and engineers to the discipline of petroleum geomechanics. It will be demonstrated that geomechanics adds value in all phases of exploration, development and production. Provides a conceptual framework for petroleum geomechanics which emphasizes fundamental concepts, properties, Earth stresses and data inputs that contribute to Mechanical Earth Models (MEM).

Duration:
6 hours

Course Code:
IHRDC_IPIMS_t38537

Content:

- Fundamental Concepts of Geomechanics
- Rock Deformation
- Rock Mechanical Properties
- Earth Stress
- Mechanical Earth Model
- Applications of Geomechanics

Structural Geology

Description:

This topic surveys structural geology from a complete view of recent plate tectonic movement through the use of modeling of ancient tectonic processes. The topic includes: stress and strain, folds, faults, joints, and fractures. It also describes several structural styles, including those that involve compressional, extensional, and strike-slip tectonics. Structures on non-tectonic origin and features involving gravity and salt tectonics are also explored in this topic.

Duration:
8 hours 33 minutes

Course Code:
IHRDC_IPIMS_t37865

Content:

- Examples of Recent Plate Tectonic Movement
- Stress and Strain
- Folds
- Faults
- Joints and Fractures
- Unconformities and Structures of Non-Tectonic Origin
- Structural Styles: Tectonic
- Structural Styles: Non-Tectonic and Intracratonic
- Process Modeling of Structural Geology

PETROLEUM GEOLOGY: Structure, Tectonics and Rock Deformation

Plate Tectonics and Sedimentary Basins

Description:

This topic presents the concepts and classification of plate tectonics as applied to petroleum exploration. Modeling techniques are used to examine tectonics processes and their involvement in the development of sedimentary basins. Also described are the sedimentary facies patterns that are associated with tectonic influences and the effects of hydrocarbon systems.

Duration:

5 hours

Course Code:

IHRDC_IPIMS_t38315

Content:

- Introduction to Plate Tectonics and Sedimentary Basins
- Plate Tectonics
- Sedimentary Basins

Divergent Margins and Rift Basins

Description:

Applies tectonic concepts learned in GL601 and 602, focusing on petroleum habitats in divergent margin and rift basins. Discusses theories of rifting and its effect on sedimentation. Classifies rift basins and examines each type through present day examples.

Duration:

3 hours 20 minutes

Course Code:

IHRDC_IPIMS_t59

Content:

- Sedimentary Basins and Continental Margins
- Petroleum Habitat
- Rifting and Basin Development
- Structural Styles and Trapping Mechanisms
- Nonmarine Basins in the Continental Interior
- Marine Basins in the Continental Interior
- Proto-Oceanic Basins
- Subsided Divergent Margins
- Exploration Considerations
- Divergent Margins and Rift Basins: Reference Section

PETROLEUM GEOLOGY: Structure, Tectonics and Rock Deformation

Convergent Margin Basins

Description:

Places convergent margins in a plate tectonic setting and examines general characteristics. Relates petroleum habitats to theories of basin development. Classifies convergent margin basins and presents examples. Proposes a strategy for petroleum exploration in convergent margin basins.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t60

Content:

- Convergent Margins
- Basin Classification and Development
- Basin Development
- Foreland Basins and Associated Structures
- Petroleum Habitat
- Convergent Tectonic Regimes
- Exploration Considerations
- Convergent Margin Basins: References and Additional Information

PETROLEUM GEOLOGY: Geochemistry

Introduction to Petroleum Chemistry

Description:
Focuses on characteristics and chemical makeup of petroleum, tracing maturation of organic matter to petroleum. Emphasizes development of kerogen and bitumen as transitional steps, and explains modification of intermediate materials during diagenesis, catagenesis, and metagenesis in response to increasing subsurface temperature. Presents examples of source-rock studies, crude-oil correlations and crude oil-source rock parings.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t61

Content:

- Petroleum
- Hydrocarbon Groups
- Resins
- Asphaltenes
- Organic Matter: Progenitor of Petroleum
- Organic Matter Maturation
- Geochemical Evaluation Overview
- Source Potential (Inherent)
- Source Potential (Realized): Kerogen Evaluation
- Source Potential (Realized): Bitumen/ Petroleum Evaluation
- Correlation Studies
- Introduction to Petroleum Chemistry: References and Additional Information

Applications of Petroleum Geochemistry

Description:
Demonstrates uses and limitations of geochemical techniques and their importance in exploration and production. Presents appropriate sample selection and preparation, as well as analytical techniques used in laboratories. Reviews and integrates basic source rock and crude oil evaluation programs into more advanced basin study and modeling programs.

Duration:
3 hours

Course Code:
IHRDC_IPIMS_t62

Content:

- Geochemical Prospecting
- Geochemical Analyses: Kerogen
- Geochemical Analyses: Bitumen/ Petroleum
- Geochemical Analyses: Analytical Procedures
- Geochemical Analyses: Sample Types
- Geochemical Analyses: Sampling Procedures
- Geochemical Programs in Petroleum Exploration
- Geochemistry and Basin Evaluation
- Geochemical Problem Solving
- Applications of Petroleum Geochemistry: References and Additional Information

PETROLEUM GEOLOGY: Petroleum Technology for the Non-Engineer

Drilling and Well Completion

Description:
Presents the integration of drilling and well completion technology in an overall development program, showing the equipment and procedures involved as operations are carried out. Focuses on the responsibilities of individuals and service companies at the drillsite.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t40

Content:

- Drilling Fundamentals
- Rotary Drilling Rig Components
- Drillstring, Drill Bits and Drilling Fluid
- Drilling Operations
- Well Completion Technology
- Case Histories, Drilling and Completion Programs
- Drilling and Well Completion: References and Additional Information

Production Technology

Description:
Describes the production technology techniques used to maximize production. Once production begins, the reservoir is only a part of a larger system, and understanding the relationships among all elements--the wellbore, tubing string, artificial lift equipment, surface control devices, separators, treaters, tanks and measuring devices--is crucial to economical and safe recovery.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t41

Content:

- Well Completions
- Surface Production Facilities
- Production System Performance
- Artificial Lift
- Production Technology: References and Additional Information

PETROLEUM GEOLOGY: Petroleum Technology for the Non-Engineer

Reservoir Management

Description:

Describes the reservoir management techniques used to maximize production. Once production begins, the reservoir is only a part of a larger system, and understanding the relationships among all elements--the wellbore, tubing string, artificial lift equipment, surface control devices, separators, treaters, tanks and measuring devices--is crucial to economical and safe recovery.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t993

Content:

- Rock and Fluid Properties
- Natural Drive Mechanisms in Petroleum Reservoirs
- Improved Oil Recovery
- Reservoir Simulation
- Reservoir Management: References and Additional Information

Geosteering: Fundamentals, Planning, and Implementation

Description:

GeoSteering is the application of geologic and engineering skill to direct a horizontal or extended-reach wellbore path, based upon knowledge of the enclosing stratigraphy, with the expressed aim of maximizing wellbore exposure to the target reservoir. This Topic reviews valuable insights into the GeoSteering process, provided by a leading company with experience gained over the course of steering nearly 2000 horizontal wells.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t36018

Content:

- Directional Drilling: The Driving Force in Geosteering
- Drilling Measurements and Logging Tools
- Preparing the Geosteering Plan
- Geosteering Practices
- Case Study
- Geosteering: Fundamentals, Planning, and Implementation: References and Add
- Best Practices

PETROLEUM GEOLOGY: Basin and Play Analysis

Basin Analysis

Description:
A complete introduction to basin evolution and evaluation. Discusses basin formation processes, geodynamic models, source rocks, maturation, migration, and sedimentary basin models. Presents the impact of basin models on prospect generation, measurement of basin histories and properties, and the principles and application of various basin evaluation methods. Refers to case studies for analysis and summary.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t64

Content:

- Basin Analysis and Petroleum Analysis
- Basin Formation Processes
- Geodynamic Models
- Source Rocks
- Maturation Processes
- Sedimentary Basin Models
- Prospect Generation
- Basin Histories and Properties
- Mathematical Basin Analysis Models
- Stratigraphic Basin Analysis Models
- Basin Analysis Case Studies
- Basin Analysis: References and Additional Information

Play Analysis

Description:
Examines the critical elements of play analysis and evaluation, including play controls for structural styles and depositional systems as well as the elements of reservoir, source, seal, trap maturation and migration, and economic considerations. Discusses the data requirements of play analysis and the planning and evolution of the play summary. Presents various examples and case studies from both frontier and developed basins.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t65

Content:

- Play Analysis Introduction
- Play Elements
- Play Controls
- Play Analysis Methods
- Risk Analysis
- Play Analysis Case Histories
- Play Analysis: References and Additional Information

PETROLEUM GEOLOGY: Surface Tools and Methods

Photogeology and Remote Sensing

Description:
Describes the physical principles of the major remote sensing techniques, evaluating the strengths and weaknesses of each during application. Discusses aerial photographs, Landsat images, SPOT images, and thermal infrared and radar techniques. Includes a glossary of remote sensing terms, and interpretation projects for each technique which relate remote surveys to other geological data.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t63

Content:

- Remote Sensing Fundamentals
- Aerial Photographs from Aircraft and Satellites
- Landsat Satellite Images
- Other Earth Resource Satellite Images: SPOT, JERS-1, IRS, and RESURS (Resource)
- Thermal Infrared Images
- Radar Images
- Remote Sensing Applied To Petroleum Geology
- References and Additional Information: Photogeology and Remote Sensing

Geographical Information Systems

Description:
This topic examines the use of Geographical Information Systems (GIS) in the oil and gas industry. Beginning with an overview of GIS design and applications and a description of Geodetic Frameworks, it examines the type of information contained in a typical oil and gas GIS. Case studies and examples are presented relating to a variety of GIS systems, and an Appendix of GIS-related websites is included to help users find the most up-to-date information in this important area.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t36166

Content:

- Introduction to Geographical Information Systems
- GIS Design and Systems
- Geodetic Frameworks
- General and Background GIS Data
- Exploration and Production GIS Data
- Examples and Case Studies
- Geographical Information Systems: References and Additional Information

PETROLEUM GEOPHYSICS: Introductory Topics and Seismic Signals

Fundamentals of Exploration Geophysics

Description:
This topic surveys geophysics from a historical perspective, as well as the evolution of the geophysicist through acquisition, processing, and interpretation. An examination of geologic elements are explored for a better understanding of hydrocarbon accumulations. Reflection seismology is introduced as a tool for integrating seismic data in oil and gas exploration.

Duration:
40 minutes

Course Code:
IHRDC_IPIMS_t37759

Content:

- Petroleum Geophysics Overview
- Seismic Methods

Waveform to Geologic Model

Description:
Explores the relationship between geological and seismic properties. Uses seismic stratigraphy to describe the seismic reflection patterns of depositional environments, how to recognize source rocks, reservoir rocks and seals, and how to infer burial history, likely saturant and geologic age.

Duration:
5 hours

Course Code:
IHRDC_IPIMS_t37918

Content:

- Rock Properties and the Seismic Response
- Rock Properties and Seismic Velocity
- Rock Properties and the Velocity-Density Relationship
- Rock Properties and Seismic Attributes
- Correlating Seismic Data to Geologic Events

PETROLEUM GEOPHYSICS: Introductory Topics and Seismic Signals

Signal Theory

Description:

Introduces the key principles of signal theory and the application of sampling precision, frequency and signal reconstruction. Explores the characteristics of waveforms, line, phase and amplitude spectra, the minimum phase spectrum, sinusoid addition, generation of harmonics, the Fourier series and the Fourier integral. Outlines the characteristics of linear and nonlinear systems. Provides an overview of general operator responses, explores the concepts of superposition, convolution, integration, and differentiation and the mechanics of filter theory. Addresses the importance of the signal-to-noise ratio and how it can be improved, provides an explanation of the processes of filtering, stacking and deconvolution and the ideal situations when each process should be employed. Defines the correlation, cross-correlation and auto-correlation functions, the impulse response of a system, and the application of pulse compression to increase resolution and the signal-to-noise ratio.

Duration:
6 hours 15 minutes

Course Code:
IHRDC_IPIMS_t38060

Content:

- Signal Theory Introduction
- Waveform Theory
- Operators
- Signal Improvement
- Correlation Techniques

Seismic Pulse

Description:

Provides an overview of the source signal components, and examines the source signatures and amplitude spectra of several different seismic sources. Reviews properties of the seismic pulse, explores measurement of source array responses, compares wavefront and ray properties, and discusses how acoustic impedance and particle velocity can be used to infer subsurface rock types. Discusses the processes of seismic decay, specifically geometrical spreading, attenuation, absorption and scattering, and their effect on the source signature. Examines small source and near field effects, and how to compensate for signal loss. Provides an overview of ray tracing laws and principles, specifically Snell's Law, Fermat's Principle, Huygens' Principle, Huygens' - Fermat's Principle, and the Principle of Reciprocity. Supplies ray theory formulas, and explains how to construct wavefront counterparts from rays.

Duration:
4 hours 24 minutes

Course Code:
IHRDC_IPIMS_t38289

Content:

- Source Signal Theory
- Attributes of the Seismic Pulse
- The Propagating Pulse
- Seismic Ray Theory

PETROLEUM GEOPHYSICS: Introductory Topics and Seismic Signals

Seismic Reflection

Description:

Explains seismic reflection theory and how it is useful for understanding seismic events. Presents the different types of multiples in seismic records, describes how they are formed, how they can interfere with primary reflectors, and explains what processes eliminate them. Identifies specific depositional environments and correlates these to seismic reflection complexes. Relates geologic stratigraphy to seismic data reflection responses. Describes basic refraction theory and key concepts, such as the critical angle, low speed layers, hidden layers and dipping layers. Distinguishes the best uses for mode conversion methods and why the concept of Amplitude Versus Offset (AVO) is important.

Duration:

5 hours 24 minutes

Course Code:

IHRDC_IPIMS_t38376

Content:

- Reflection Theory
- Diffuse Reflections and Multiples
- Reflection and Geologic Interfaces
- Refraction Theory & Non-Normal Incidence

PETROLEUM GEOPHYSICS: Seismic Instruments and Field Techniques

Introduction to Field Work

Description:

Introduces the field aspects of reflection seismology, examining seismic exploration in the field--on land, at sea, and in between. Describes elements of seismic operation--instruments, locations, people and steps taken by seismic crews to record high-quality data.
Details various tasks and environments peculiar to land-oriented field work. Emphasizes use of explosive sources and safety of operations. Stresses public relations due to direct impact of land work on land owners, lessees and political bodies. Analyzes field work at sea and in the transition zone. Examines equipment, costs and special problems, hazards, requirements and advantages of field work in marine settings. Particular attention is paid to navigational systems.

Duration:
6 hours

Course Code:
IHRDC_IPIMS_t72

Content:

- Introduction to Field Work
- Improving the Signal-to-Noise Ratio
- Multiple Coverage in Action
- Recording Instruments
- The Land Seismic Source
- The Land Seismic Receiver
- The Seismic Record
- Acquisition Constraints
- Maps and Imagery in Seismic Planning
- Costs and Contracts
- Marine Work
- The Transition Zone
- Multi-Component Data
- Organization of the Field Crew
- Safety
- The Location of Seismic Lines
- The Observer's Report
- Introduction to Field Work: Exercises
- Introduction to Field Work: References and Additional Information

Surveying and Mapping on Land

Description:

Describes tasks of seismic crew surveyor: laying out seismic lines and recording spatial coordinates of each source or receiver. Emphasizes precision, accuracy and appropriate tools. Examines electronic surveying and satellite-aided positioning, including Global Positioning System.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t75

Content:

- Objectives and Requirements
- The Figure and Rotation of the Earth
- Frames of Reference
- Surveying Methods
- Land Surveying in Practice
- Satellite Positioning Methods
- Surveying and Mapping on Land: Exercises
- Surveying and Mapping on Land: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Instruments and Field Techniques

Positioning and Mapping at Sea

Description:
Illustrates requirements and methods of navigation and positioning in marine seismic operations. Gives the land surveyor's nautical counterpart the necessary background to make required measurements, computations and compensations. Illustrates steering ship on a planned line, relating line to previous surveys, and ensuring that a drilling rig can return to optimal location.

Duration:
4 hours 20 minutes

Course Code:
IHRDC_IPIMS_t76

Content:

- Introduction to Positioning and Mapping at Sea
- Towed Streamer Acquisition
- Satellite Positioning Systems
- Secondary Positioning Systems
- Positioning Systems Calibration
- Definitions Controls and Checks
- Navigation Data
- Navigation QC and Reporting
- Additional Exploration Positioning Requirements
- New Developments
- Supplemental Information
- Positioning and Mapping at Sea: Exercises
- Positioning and Mapping at Sea: References and Additional Information

Multiple Coverage

Description:
Focuses on multiple coverage method of obtaining field data, which is an efficient means of improving signal-to-noise ratio, and discusses use on land and at sea. Describes combination with common-midpoint stacking to further improve the ratio. Illustrates survey planning to maximize coverage, minimize noise and work around physical obstacles.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t77

Content:

- Background
- The Benefits and Limitations of Multiple Coverage
- The Surface Diagram
- Multiple Coverage at Sea
- Multiple Coverage On Land
- Common-midpoint Stacking
- Migration and Multiple Coverage
- Vertical Seismic Profiling
- Summary and Conclusions
- Multiple Coverage: Exercises
- Multiple Coverage: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Instruments and Field Techniques

Array Design

Description:
Illustrates noise reduction in the field by using arrays to enhance signal-to-noise ratio. Harmonizes array design as a field problem with array design as a processing problem. Introduces an easy and effective approach to array design.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t78

Content:

- Array Design
- Factors Affecting Group Dimensions
- Approaches to Array Design
- Traditional Array Design
- Field Tests Measuring Source Generated Noise
- A Universal Approach to Acquisition
- Arrays in 3D
- Arrays at Sea
- Array Design: Exercises
- Array Design: References and Additional Information

Vibroseis

Description:
Describes vibroseis--its use in the field and its processing requirements--as an attractive alternative to explosives in restricted areas, now used in over half of all land operations. Discusses the mechanics of vibrator technology and the concept of pulse compression to shape the sweep to an "impulsive" form.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t79

Content:

- Vibroseis in Principle
- Vibroseis in Practice
- Vibroseis: Exercises
- Vibroseis: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Instruments and Field Techniques

Choosing the Field Variables

Description:
Analyzes the exploration problem, the proper design of field programs, and the importance of the frequency variable. Demonstrates how other variables depend on frequency and on each other. Illustrates how to optimize field work.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t80

Content:

- Introduction and Basic Concepts
- Judgements From the Field Data
- Field Variables
- Experimental Shooting
- Criteria for Choosing Field Variables
- The Land Impulsive Source
- The Vibroseis Source
- Receivers and Recording Systems
- Marine and Transition Zone Surveys
- Conclusions
- Choosing the Field Variables: References and Additional Information
- Choosing the Field Variables: Exercises

Quality Control in the Field

Description:
Discusses quality control of land and marine operations. Presents the four major considerations of field quality control: positioning, operations, record quality and reporting. Discusses crew safety and environmental concerns.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t81

Content:

- Introduction to Quality Control in the Field
- Land Surveys
- Marine Surveys
- Safety and Environmental Concerns
- Cost Effectiveness
- Quality Control in the Field: References and Additional Information
- Quality Control in the Field: Exercises

PETROLEUM GEOPHYSICS: Seismic Instruments and Field Techniques

Multicomponent Seismic Applications

Description:

Provides an understanding of the value of recording multicomponent seismic data. Describes the concepts of wave propagation, shear wave splitting and amplitude variation with offset. Provides the basic principles of processing and interpretation of multicomponent data.

Duration:

3 hours 40 minutes

Course Code:

IHRDC_IPIMS_t6105

Content:

- Introduction to Multicomponent Seismic Applications
- Exploration Value
- Theory
- Shear Source Shear Receiver
- Compression Source Compression Receiver
- Compression Source Shear Receiver
- Processing
- Interpretation
- Review of Best Practices
- Multicomponent Seismic Applications: References and Additional Information
- Multicomponent Seismic Applications: Exercises

PETROLEUM GEOPHYSICS: Seismic Processing

Basic Seismic Processing

Description:

This course outlines the three major steps in seismic processing flows, defines seismic noise and lists the two types of noise that processing tries to suppress. The advantage of common-midpoint multiplicity is explained, ground roll is identified on a seismic section and the kinds of filtering used to remove ground roll are demonstrated. The course describes how array simulation improves the lateral continuity of seismic sections. The mathematical operation of demultiplexing is described, the reasons for noisy traces are identified and the ways to correct them are covered. It explains reasons for seismic amplitude decay and defines the common ways to correct it. The various forms of datum corrections are outlined and why these methods are employed is explained. The course defines the process of deconvolution and what the process improves. The advantages of the multifold acquisition technique are outlined. How normal moveout increases reflection time is explained and the normal moveout correction process is described. CMP stacking, stacking velocity and the process of migration are defined. How reflections are moved with migration is described. It explains the two main goals of seismic post-processes and the benefits of the F-X deconvolution filter. The historical, primary trace display modes and reasons for choosing plotting scales are outlined.

Duration:
3 hour 32 minutes

Course Code:
IHRDC_IPIMS_t39798

Content:

- Overview of Seismic Processing
- Pre-Processing and Deconvolution
- Stacking and Velocity Analysis
- Migration and Post-Processes

Initial Processes

Description:

Describes the SEG-D and SEG-Y formats for recording and storing seismic data, along with the Observer's Reports and Field Notes that contain essential information for seismic data processing, and the initial checks that are performed on field data. Examines the steps involved in pre-processing seismic data, including gain recovery, de-multiplexing, re-sampling, assigning geometry, datum corrections, amplitude adjustments, trace editing, common midpoint gather and common offset gather. Addresses the practical considerations involved in selecting variables, establishing the processing order and reprocessing existing seismic lines.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t36535

Content:

- Field Data
- Pre-Processing Flow
- Practical Considerations
- Initial Processes: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Processing

Velocities

Description:

Reviews the physical factors that influence seismic velocity. Defines the various components of seismic velocity, and introduces the concepts of stacking velocity and normal moveout. Describes analysis procedures and the practical considerations involved, including techniques for interpreting and refining the velocity model. Discusses velocity analysis for anisotropic media. Provides overviews of tomographic velocity analysis and migration velocity analysis.

Duration:

2 hours 20 minutes

Course Code:

IHRDC_IPIMS_t36565

Content:

- Influencing Factors
- Seismic Velocities Definition
- Velocity Analysis
- Practical Considerations for Velocity Analysis
- Interpreting and Refining the Velocity Model
- Additional Technologies
- Velocities: References and Additional Information

Static Corrections

Description:

Examines how static corrections are applied to seismic data to compensate for near-surface or water-bottom effects. Describes long-wavelength static problems and computation methods, including considerations in choosing a seismic datum and accounting for the geology of the area. Examines deterministic methods for deriving the near-surface velocity model. Discusses short-wavelength static corrections, including cross-correlation methods, surface-consistent methods, genetic algorithms, cross-dip corrections and 3-D statics. Describes layer replacement techniques of ray trace modeling and wave equation datuming.

Duration:

2 hours

Course Code:

IHRDC_IPIMS_t36726

Content:

- Basic Concepts
- Long Wavelength Statics
- Deterministic Techniques for Deriving the Near Surface Velocity Models
- Short Wavelength Static (Residual Static)
- Layer Replacement Techniques
- Static Corrections: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Processing

Deconvolution

Description:

Introduces the concept of the convolutional model and describes the use of deconvolution in removing coherent noise and minimizing the effect of the wavelet on the final stack. Defines deconvolution parameters. Examines single-trace, deterministic and multi-trace deconvolution methods, along with alternative methods such as maximum likelihood, minimum entropy and L1-norm deconvolution. Addresses practical considerations in applying deconvolution methods and provides a suggested processing scheme.

Duration:

2 hours 20 minutes

Course Code:

IHRDC_IPIMS_t36653

Content:

- Conceptual Introduction to Seismic Deconvolution
- Basic Concepts
- Single-Trace Statistical Deconvolution
- Deterministic Methods
- Multi-Trace Deconvolution
- Alternative Methods of Deconvolution
- Practical Considerations in Deconvolution
- Deconvolution: References and Additional Information

Stacking, Filtering and Display

Description:

Describes the process of common midpoint stacking and introduces alternate forms of stacking. Examines the use of two-dimensional filters in separating different arrivals on the basis of their characteristic velocities. Discusses pre-stack and post-stack filtering processes, and the use of band pass filters, time variant filters and filter panels. Reviews different methods for displaying final record sections based on the needs of the seismic interpreter.

Duration:

2 hours

Course Code:

IHRDC_IPIMS_t36607

Content:

- Common Midpoint Stacking
- Alternative Forms
- Velocity Filters
- Final Filtering
- Display
- Stacking, Filtering and Display: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Processing

Multiple Attenuation

Description:

Conventional seismic processing assumes that primaries are our wanted signal and that multiples are noise. This present topic discusses the characteristics of these multiples and how they lead to the selection of the most appropriate attenuation method. We define primaries as signals that have only one downward path, one reflection and one upward path. However, in practice, we frequently use sources and receivers below the surface and this leads to ghost reflections. When these ghost reflections follow the primary closely, within perhaps 20 ms, these are treated as being part of the source pulse or the receiver response and not considered as multiples though technically they are multiples.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t37611

Content:

- Multiples and their Characteristics
- Multiple Attenuation Method

Seismic Migration

Description:

Reviews the seismic reflection process. Examines the fundamentals of seismic migration and how geological features affect seismic data. Discusses practical considerations in applying migration methods. Addresses the issue of seismic migration in anisotropic media.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t36616

Content:

- Overview of Seismic Migration
- Seismic Migration Methods
- Depth Migration
- 2D Versus 3D Migration
- Seismic Migration in Anisotropic Media
- Seismic Migration: References and Additional Information

PETROLEUM GEOPHYSICS: Seismic Processing

Synthetic Seismogram Modeling

Description:

This course introduces the techniques used in forward modeling the acoustic properties of the earth to predict the seismic response of the earth. The synthetic seismogram, commonly called "the synthetic," is the resulting one-dimensional model used to identify the relationship between reflection events on a seismic section with marker horizons identified in well logs or to determine the wavelet embedded in the seismic data. The course's overall intent is to develop your capability to competently and confidently employ synthetics in exploration and production. Upon completion of this course, you will better understand how to prepare a synthetic and what assumptions and factors affect the validity of the model.

Duration:
40 minutes

Course Code:
IHRDC_IPIMS_t37216

Content:

- Synthetic Seismogram

PETROLEUM GEOPHYSICS: Seismic Interpretation

Basic Seismic Interpretation

Description:

Introduces seismic data interpretation. Lists the four basic steps in structural seismic interpretation. Identifies where to pick the horizon on the seismic waveform and why. Explains why migration changes the reflection times on dip lines, but does not change them on strike lines. Recognizes the location of favorable traps for hydrocarbon accumulations. Explains the timing and the depositional mechanics of faulting and how this impacts oil and gas migration. States the different types of seismic effects that can be misleading during interpretation. Explains the concept of sequences; intervals within which the sediments are genetically related. Describes how the amplitude, polarity, and shape of the seismic signal are important to understanding the geological lateral variations of the subsurface. Differentiates between bright spots, flat spots and dim spots on seismic sections, and explains what causes these direct hydrocarbon indicators. Outlines how crosswell seismology provides high density, depth-calibrated seismic data between two wellbores. Describes how and where seismic attributes are applied.

Duration:
5 hours

Course Code:
IHRDC_IPIMS_t38736

Content:

- Introduction to Seismic Interpretation
- Structural Interpretation
- Seismic Stratigraphy
- Seismic Interpretation Methods
- Interpretation with Seismic Attributes

Fault Interpretation

Description:

Details the questions we must answer in fault interpretations, such as the source, seal, hydrocarbon generation and migration, and fault reactivation. Addresses how faults can act as both conduits and seals and how these work together to create reservoirs. Identifies the four special states of stress, the three deformations stages in the stress-strain diagram, and the structural hydrocarbon trap types that result from or are associated with some form of faulting. Explains why faults are generally classified on the basis of their relative sense of displacement. Defines the basic rules for fault interpretation, and the structural styles and characteristic geographic locations of basement-involved faulting. Explains the general aspects of foreland thrust belts that are of direct importance to hydrocarbon exploration. Lists the various workstation views that can aid in fault interpretation. Identifies how 3D detail helps with structural fault contours, and the sealing and leaking properties of major faults. Describes how time slice movies help to recognize and locate smaller faults and improve precision of defining their fault boundaries.

Duration:
9 hours 36 minutes

Course Code:
IHRDC_IPIMS_t38868

Content:

- Faults in Petroleum Provinces
- Stress and Strain
- Fault Nomenclature
- Seismic Expression of Faults
- Fault Data Interpretation
- Divergent Basins: Structural Styles
- Convergent Basins: Structural Styles
- Faults: 3D and Workstation Interpretation

PETROLEUM GEOPHYSICS: Seismic Interpretation

Seismic Contouring

Description:

This topic lists sources of evidence that can be used to supplement the best contouring interpretation. Explains how different interpretations can be obtained from the same data, and how to decide which interpretations are more accurate. Details the key features needed for a pick to represent a geologically meaningful surface. Describes the SEG 1975 seismic polarity convention. Defines several options for picking migrated and unmigrated sections. Lists the recommended practices for choosing map contour intervals. Details the ethics of contouring. Explains the differences between the gridding and triangular approach for machine contouring. Provides the major uses of an interval map and explains how these are made. Describes the contouring differences between two-dimensional high-pass and low-pass filtering.

Duration:
7 hours 28 minutes

Course Code:
IHRDC_IPIMS_t39020

Content:

- Contouring Fundamentals
- Contouring by Hand: Picking
- Contouring by Hand: Solving Misties
- Contouring by Hand: Practical Procedures
- Contouring by Machine
- Contour Maps: Operations

Velocity Interpretation and Depth Conversion

Description:

This topic outlines the process of integration when working with velocity data. It discusses the types of velocities used in seismic processing, defines their application, identifies the different velocity curves versus time, and describes how to use Dix's equation to calculate interval velocities. NMO correction and the application to seismic signals is explained. The relationship between velocity and the quantity of sand or shale in stratigraphic layers is addressed as well as the effects of lithology on velocity. The differences between a VSP and a checkshot survey, and a number of ways we use sonic logs and associated data in exploration processes are discussed. It provides details on the three basic factors that we must consider when using a sonic log, lists several tests to ensure the quality of the velocity data, and explains the various sources of statistical error that limit the use of velocities. The topic outlines how seismically derived velocities can be used with sparse well control, identifies two methods that can be used when exploration objectives require a reliable depth conversion algorithm, and explains how interval stacking velocity maps are used to extend values obtained from area wells.

Duration:
7 hours 3 minutes

Course Code:
IHRDC_IPIMS_t39106

Content:

- Seismic Velocities
- Normalized Interval Velocity
- Well Velocities
- Seismic Velocity Databases
- Time-Depth Conversion Methods
- Normalized Interval Velocity Techniques
- Additional Examples for Time-Depth Conversion

PETROLEUM GEOPHYSICS: Seismic Interpretation

Hydrocarbon Indicators

Description:

This topic outlines developments in seismic technology as they relate to direct hydrocarbon indicators. It lists the questions an interpreter should address to validate observed hydrocarbon indicators, and explains how to identify the relationship between lithology, a propagating wavelet and the seismic response. How color displays enhance our ability to visually discern data is described. The most important parameters used in employing seismic data as HCIs and why these are important are outlined. The use of frequencies in association with interpretive parameters and HCIs are listed. Major concerns with the use of frequency in subsurface HCI interpretation are identified. It lists the typical considerations that go into seismic velocity analysis. The topic explains the velocity crossover as a function of depth and geologic age for gas- and water-filled sand/shale sequences. Some of the positive and negative outcomes of AVO are outlined. Why a bed that is thinning or pinching will have the clearest seismic expression when tuning thickness is reached is explained. The primary purpose of seismic inverse modeling is described. Four ways that fractured reservoirs can be characterized with data from shear wave investigations are outlined.

Duration:
7 hours 39 minutes

Course Code:
IHRDC_IPIMS_t39389

Content:

- Seismic Methods and Hydrocarbon Detection
- Reflections and Seismic Parameters
- Seismic Attributes and Their Preservation
- Amplitude HCIs
- Amplitude Versus Offset (AVO)
- Seismic Modeling
- Shear Waves and Other Hydrocarbon Indicators

Seismic Stratigraphic Modeling

Description:

This topic details the four basic rules to follow when acquiring seismic data for stratigraphic purposes and the four different processes for maximizing resolution in stratigraphic processing. It outlines two methods for extracting stratigraphic information from seismic data, describes lateral and vertical resolution and explains how these variables are used to interpret stratigraphic traps on seismic sections. The course lists three common sources used for acquiring seismic data and how their wavelets differ. Two variations in seismic amplitude responses due to changes in the type of pore fluid are defined. How the pore fluid type affects the seismic parameters of reflectivity, acoustic impedance and reflection coefficients are identified. The relationship between velocity and depth in terms of history and porosity is explained. The stratigraphic modeling categories are listed. The differences between forward and inverse modeling are outlined. The difference between one-dimensional and multi-dimensional modeling is described. How to generate a synthetic seismogram is discussed. The differences between an acoustic impedance log and a sonic log are identified. The inversion modeling process is described. The effects of attenuation and geometric spreading on inversion data is explained. Limitations with the AVO method are identified. The theory on which the AVO method is based is outlined.

Duration:
3 hours 40 minutes

Course Code:
IHRDC_IPIMS_t39607

Content:

- Stratigraphic Prospects and Seismology
- Velocity and Seismic Responses
- Forward Modeling
- Inverse Modeling
- Amplitude Versus Offset Analysis

PETROLEUM GEOPHYSICS: Seismic Interpretation

Seismic Interpretation of Shales

Description:

This topic outlines the seven common types of unconventionals. It identifies the twelve desired characteristics of productive shale gas formations and outlines the impact of unconventional drilling on shale gas resources. The process of hydraulic fracture stimulation is described. The potential for seismic to help in the search for shale reservoirs is explained. Important mechanical rock properties for reservoir engineers that help with reservoir characterization are listed. The three seismic attributes that are useful for identifying optimal drilling locations are identified, and how these attributes are derived from the direct seismic is explained. It defines the three common current inversion methods. Two important factors that affect unconventional rock velocity are described. It outlines two important factors of velocities and explains how this determines the placement of wellbores. The coherence attribute and the features it helps to identify are explained. The main objectives of a microseismic survey are discussed. It lists the reasons it is important to identify faults early in the hydrofracking operation. Four key reasons microseismic is used to monitor well stimulation activities are explained.

Duration:

4 hours 41 minutes

Course Code:

IHRDC_IPIMS_t39461

Content:

- Unconventionals
- Seismic Attributes
- Geometric Attributes
- Fracture Monitoring With Microseismic

PETROLEUM GEOPHYSICS: 3-D Seismic and Time-Lapse Methods

3D and 4D Seismic Modeling, Design and Acquisition

Description:

This course explains how the final 3D processed traces fit to an interpretation grid. It lists three seismic displays that are unique to 3D data. The primary differences in acquisition techniques between 2D and 3D projects are discussed. The three significant advantages of 3D seismic over 2D seismic are identified. It details how investing in a 3D survey helps reduce risks associated with drilling a dry hole. How the Fresnel Zone and frequency content are related when designing a 3D survey are discussed. The key considerations of 3D target analysis in pre-acquisition modeling are identified. It lists the four main benefits of wide azimuth surveys. The four criteria that a successful 4D program should meet are described. The three primary components of the 4D program design process are detailed. It describes the Global Positioning System and explains how it is used in seismic surveys. Six common land and marine seismic acquisition equipment configuration techniques are described. The vessels and equipment used in transition zone seismic acquisition are explained. The course discusses how different quality control techniques are used to improve seismic data.

Duration:

4 hours 42 minutes

Course Code:

IHRDC_IPIMS_t39911

Content:

- Overview of 3D Seismic Techniques
- 3D and 4D Seismic Acquisition Modeling and Design
- Seismic Acquisition Techniques

PETROLEUM GEOPHYSICS: Borehole Geophysics and Non-Seismic Methods

Gravity and Magnetics

Description:

Provides a basic introduction to gravity and magnetic theory and data, with the key Earth properties that contribute to the effects, modeling and interpretation of gravity and magnetic anomalies. Examines the physical processes responsible for observed gravimetric and magnetic effects, relating them to specific geophysical, geological or geochemical features. Explains various instrument types, proper field techniques and conditions, and data reduction, correction, and processing methods. Using extensive case studies, discusses modeling, time-lapse, time-varying, depth estimation techniques, interpretation and extrapolation of both surface and borehole gravity surveys, and magnetic surveys.

Duration:
10 hours 16 minutes

Course Code:
IHRDC_IPIMS_t38500

Content:

- Introduction to Gravity and Magnetic Data
- Density of the Earth
- Modeling the Gravity Effects of Geologic Bodies
- Reduction and Processing of Gravity Data
- Surface Gravity Interpretation
- Borehole Gravity
- Gravity Gradiometry and Time-Lapse Gravity Measurements
- Introduction to Magnetic Data
- Magnetic Anomalies: Their Geological Significance and Signatures
- Magnetic Instruments and Field Surveys
- Magnetic Data Processing and Interpretation

Controlled Source Electromagnetic Methods

Description:

This course aims to describe the present state of the art of the controlled source electromagnetic (CSEM) method as applied to the search for hydrocarbons, with particular emphasis on the the multi-channel electromagnetic (MTEM) method. This course compares electromagnetic and seismic propagation at certain points, emphasizing both the similarities and the differences. EM exploration for hydrocarbons is today roughly where seismic exploration was in the late 1960's. EM exploration for hydrocarbons is today roughly where seismic exploration was in the late 1960's

Duration:
4 hours 20 minutes

Course Code:
IHRDC_IPIMS_t37435

Content:

- Overview
- Introduction to EM and its role in the Petroleum Industry
- Fourier Theory
- Electromagnetic Waves
- Passive Electromagnetics
- Overview of Controlled-Source Electromagnetic (CSEM) Methods
- Source Control in Controlled Source Electromagnetics (CSEM)
- Conventional Marine CSEM Data Acquisition and Processing
- Land MTEM Data Acquisition and Processing
- Marine MTEM Data Acquisition and Processing
- Effect of the water layer on marine CSEM data
- Modeling and Inversion to Determine Resistivity
- References and Additional Information

PETROLEUM GEOPHYSICS: Borehole Geophysics and Non-Seismic Methods

Crosswell Seismology

Description:

Crosswell methods use seismic tomography to image the reservoir zone between two or more wells. This topic introduces you to crosswell techniques and helps you understand when and where to apply them.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t5600

Content:

- Introduction to Crosswell Seismology
- When to Run a Crosswell Survey
- Crosswell Data Acquisition
- Crosswell Seismic Data Processing and Analysis
- Crosswell Seismology Case Studies
- Crosswell Seismology Exercises
- Crosswell Seismology References and Additional Information
- Crosswell Seismology Recommended Practices

Vertical Seismic Profiles

Description:

Examines VSP sources and receivers, and presents guidelines for planning and executing VSP surveys. Discusses data acquisition, processing and interpretation, and methods for correlating VSP and seismic data. Provides examples of VSP exploration and applications.

Duration:
4 hours 20 minutes

Course Code:
IHRDC_IPIMS_t6365

Content:

- Introduction to Vertical Seismic Profiles
- VSP Survey Fundamentals
- VSP Survey Recording Geometries
- The VSP Receiver
- The VSP Source
- Recording Systems
- Pre-Survey Modeling
- VSP Acquisition Practices and Concerns
- VSP Processing Fundamentals
- VSP Applications
- Summary
- Vertical Seismic Profiles: References and Additional Information
- Vertical Seismic Profiles: Exercises

PETROLEUM GEOPHYSICS: Borehole Geophysics and Non-Seismic Methods

Other Geophysical Techniques

Description:

Presents in-situ velocity measurements. Integrates acoustic-log data with velocity survey data. Describes interpretation of first break arrival times and considerations in constructing a synthetic seismogram. Emphasizes correlation between the seismic section and the synthetic seismogram.

Duration:
1 hour

Course Code:
IHRDC_IPIMS_t996

Content:

- Borehole Velocity Measurements
- Other Geophysical Techniques: References and Additional Information

Microseismic Studies of Reservoirs

Description:

This course introduces the basics of using microseismic surveys to study hydrocarbon reservoirs. A microseismic survey is a 3D technology used to monitor subsurface processes by analyzing microearthquakes. Microearthquakes occur when production, injection or hydraulic fracturing cause changes in the pore pressure of a hydrocarbon reservoir that trigger slippage on bedding planes or fractures. The course begins with basic topics required to understand microseismic events and then discusses applications of microseismic surveys. Among the applications are monitoring fracture stimulation operations and relating production to microseismic data. The course includes examples, exercises and offers a list of digital papers for those interested in more information about a particular topic.

Duration:
5 hours 20 minutes

Course Code:
IHRDC_IPIMS_t37056

Content:

- Applications for Microseismic Surveys
- Anatomy of Microseismic Events
- Relating Stress and Pore Pressure to Microseismic Events
- Failure Criteria for Microearthquakes
- Getting a First Velocity Model for Event Location
- Updating the Velocity Using Microseismic Events
- Source Mechanisms of Microearthquakes
- Interpreting Microseismic Patterns and Source Mechanism Evolution
- Monitoring Shale Gas Through Hydraulic Fracturing
- Microseismic Monitoring Reservoirs without Hydraulic Fracturing
- Estimating Reservoir Properties using Microseismic Events
- Determining the Best Interval for Production
- Surface Seismic Compliment to Microseismic Surveys
- The Future of Microseismic Developments
- Microseismic: Exercises
- Microseismic: References and Additional Information

PETROLEUM ENGINEERING: Petroleum Production Performance

Fluid Flow and the Production System

Description:

Describes the basic components of a flowing well production system and examines how they are related to each other. Examines in detail the concepts of inflow performance, lift performance and surface choke performance. Introduces and demonstrates a systems analysis approach to evaluating and optimizing well performance. Presents methods for evaluating production performance, including techniques for decline curve analysis.

Duration:

6 hours 30 minutes

Course Code:

IHRDC_IPIMS_t38341

Content:

- Production Systems
- Inflow Performance Relationship
- Lift Performance
- Flowing Well Performance
- Production Rate Decline Curves

Artificial Lift Methods

Description:

Introduces artificial lift methods, including gas lift, pump-assisted lift, and plunger lift. Discusses applications, design, and installation of each method, as well as operational and monitoring recommendations.

Duration:

8 hours 30 minutes

Course Code:

IHRDC_IPIMS_t37801

Content:

- Artificial Lift Overview
- Gas Lift
- Reciprocating Rod Pump Systems
- Progressive Cavity Pump Systems
- Hydraulic Pump Systems
- Electrical Submersible Pump Systems
- Plunger Lift Systems

PETROLEUM ENGINEERING: Production Equipment and Operations

Wellheads, Flow Control Equipment and Flowlines

Description:
Reviews the types and features of casing and tubing housings, Christmas tree components and flowline valves, as well as flowline sizing, installations and operating procedures. Describes the basic design and operating requirements of typical production manifolds and presents a wide variety of equipment options.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t110

Content:

- Casing and Tubing Head Equipment
- Flow Control at the Wellhead
- Flowlines
- Valves, Fittings and Flanges
- Production Manifolds
- Wellheads, Flow Control Equipment and Flowlines: References and Additional

Fluid Separation and Treatment

Description:
Describes the functions and components of vertical and horizontal separators and oil treating equipment. Illustrates design considerations, including sizing calculations, for both two-phase and three-phase flow.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t111

Content:

- Production Facility Overview
- Separation of Produced Fluids
- Treatment of Separation Oil
- Fluid Separation and Treatment: References and Additional Information

PETROLEUM ENGINEERING: Production Equipment and Operations

Oilfield Safety

Description:

Introduces principles and general procedures for managing emergencies, reporting and investigating accidents, and maintaining safety in day-to-day activities. Addresses hazards that are common to most oil and gas sites, emphasizing awareness, planning and training as keys to preventing accidents.

Duration:

2 hours 20 minutes

Course Code:

IHRDC_IPIMS_t113

Content:

- Emergency Preparedness
- Incident Reporting and Investigation
- Safety Hazards in Oil and Gas Production
- Safe Work Practices
- Safety and Control of Site Activities
- Fire Prevention and Control
- Oilfield Safety: References and Additional Information

Cased Hole Logging

Description:

Introduces the logging techniques used in cased wells. Describes various types of radioactive tools for determining lithology and fluid saturation, acoustic devices for well integrity logging, and a range of flow monitoring logs. Highlights each tool's operating principles.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t114

Content:

- Cased Hole Logging Overview
- Formation Evaluation in Cased Holes
- Cement Bond Evaluation
- Casing Inspection
- Qualitative Flow Evaluation
- Flow Rate Determination in the Wellbore
- Production Logging of Multiphase Flow in Horizontal Wells
- Cased Hole Logging: References and Additional Information

PETROLEUM ENGINEERING: Production Equipment and Operations

Intelligent Completions

Description:

As the oil industry matures, it must seek better and more efficient ways to exploit diminishing resources. To maximize production and improve the economics of reservoirs, oil companies must resort to a wide range of sophisticated completion strategies. By real-time data monitoring with remote-controlled sliding sleeves or variable chokes, intelligent completions help operators to better manage production, eliminate or reduce interventions and associated production downtime, well costs and risks. This new IPIMS topic discusses the overall evolution of intelligent well completions, and describes a variety of intelligent well technologies that focus on measurement and control techniques to optimize oil and gas production.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t36209

Content:

- Introduction to Intelligent Completions
- Fundamentals of Pressure Sensors
- Fiber Optic Sensing and Telemetry Systems
- Downhole Flow Control
- Assessing Reliability
- Intelligent Completions: References and Further Reading

Overview of Rigless Well Intervention

Description:

This topic introduces the basic terminology, purpose, and economics of rigless well intervention. The health, safety, and environment (HSE) factors that must be considered when planning for and carrying out rigless well intervention activities are presented. The topic also covers the various tasks, roles, and responsibilities along with general preparation and well selection guidelines.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t38106

Content:

- Introduction to Rigless Well Intervention
- Operating Considerations in Rigless Well Intervention

PETROLEUM ENGINEERING: Production Equipment and Operations

Electric Line Well Intervention

Description:
This topic presents the basic elements of an electric line well intervention and outlines the steps involved in pre-job planning, job execution, and post-job activities from a field engineering/operations standpoint. The general surface and subsurface equipment used in electric line operations are discussed as well as downhole tools provided by the major service companies and used by electric line operators. In addition, this topic describes general operating procedures for carrying out electric line operations, with an emphasis on HSE considerations.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t38206

Content:

- Overview of Electric Line Well Intervention
- Basic Electric Line Equipment
- Electric Line Downhole Tools
- Electric Line Operations

Slickline Well Intervention

Description:
This topic presents the basic elements of a slickline well intervention and outlines the steps involved in pre-job planning, job execution, and post-job activities from a field engineering/operations standpoint. The general surface and subsurface equipment used in slickline operations are discussed as well as downhole slickline tools provided by the major service companies and used by slickline operators. In addition, this topic describes general operating procedures for carrying out slickline operations, with an emphasis on HSE considerations.

Duration:
5 hours 12 minutes

Course Code:
IHRDC_IPIMS_t38011

Content:

- Overview of Slickline Well Intervention
- Basic Slickline Equipment
- Slickline Service Tools
- Subsurface Flow Controls
- Advanced Slickline Applications
- Slickline Operations

PETROLEUM ENGINEERING: Production Equipment and Operations

Coiled Tubing Well Intervention

Description:

This topic presents the basic elements of a coiled tubing well intervention and outlines the steps involved in pre-job planning, job execution, and post-job activities from a field engineering/operations standpoint. The general surface and subsurface equipment used in coiled tubing operations are discussed, as well as downhole tools provided by the major service companies and used by coiled tubing operators. In addition, this topic describes general operating procedures for carrying out coiled tubing operations, with an emphasis on HSE considerations.

Duration:

2 hours 20 minutes

Course Code:

IHRDC_IPIMS_t38235

Content:

- Overview of Coiled Tubing Well Intervention
- Basic Coiled Tubing Equipment
- Coiled Tubing Downhole Tools
- Coiled Tubing Operations

PETROLEUM ENGINEERING: Drilling Engineering

Well Planning

Description:
Introduces the drilling procedure and provides a clear "blueprint" for the safe, efficient drilling of a well. Integrates the mud, casing, bit, cementing and safety programs. Presents an understanding of how a well proposal is initiated and justified economically.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t115

Content:

- Well Planning Overview
- Well Selection
- AFE Preparation
- Well Plan Organization and Data Gathering
- Well Design Considerations
- Rig Design Considerations
- Procedures
- Drilling Contracts
- Cost Reviews
- Well Planning: References and Additional Information

Drill String Components

Description:
Introduces the tools that make up a typical drill string, including the kelly, the drill pipe, and the components of the bottomhole assembly. Describes design, selection, performance and evaluation of common drill bit types. Emphasizes the general application of various downhole tools and development of sound drilling practices.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t116

Content:

- Drill String Overview
- Kelly
- Drill Pipe
- Drill Collars
- Heavy Wall Drill Pipe
- Bottomhole Assembly Tools
- Drill String Components: References and Additional Information

PETROLEUM ENGINEERING: Drilling Engineering

Drill Bits

Description:
Describes design, selection, performance and evaluation of common drill bit types. Emphasizes the general application of various downhole tools and development of sound drilling practices.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t983

Content:

- Introduction to Drill Bits
- Roller Cone Bit Design
- Fixed Cutter Bit Design
- Bit Hydraulics
- Bit Selection Criteria
- Bit Grading and Evaluation
- Bit Operating Guidelines
- Bit Run Optimization
- Drill Bits: References and Additional Information

Drilling Fluids and the Circulating System

Description:
Introduces drilling fluid types and describes field monitoring of their properties, along with cleaning and circulation equipment employed at the wellsite. Emphasizes applications of drilling fluids and unique properties which make each fluid suitable to control specific subsurface environments. Incorporates field footage of equipment with laboratory footage showing mud components and testing procedures. Summarizes environmental concerns related to use and disposal of drilling fluids. Includes basic calculations used in drilling fluid engineering.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t117

Content:

- Drilling Fluids Overview
- Drilling Rig Circulating System
- Drilling Fluid Components and Additives
- Drilling Fluid Systems
- Solids Control
- Clay Chemistry
- Environmental Aspects of Drilling Mud Engineering
- Field Tests of Drilling Fluids
- Mud Engineering Calculations
- Drilling Fluids and the Circulating System: References and Additional Information

PETROLEUM ENGINEERING: Drilling Engineering

Directional and Horizontal Drilling

Description:

Introduces basic principles of wellbore deviation and directional control. Describes features, applications, benefits and limitations of various directional and horizontal well profiles. Discusses tools, planning, survey techniques and operating practices, pointing out problems that are unique to horizontal and high-angle directional drilling.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t118

Content:

- Directional Drilling Overview
- Deviation in Vertical Wells
- Directional Drilling Tools and Techniques
- Horizontal Wells
- Drilling Hydraulics in Deviated Wells
- Drill String and Bit Considerations in Deviated Wells
- Underbalanced Drilling in Directional Wells
- Directional and Horizontal Drilling: References and Additional Information

Underbalanced Drilling

Description:

This presentation covers the underbalanced drilling method, which is defined as the practice of drilling a well with the wellbore fluid gradient less than the natural formation gradient. Besides minimizing lost circulation and increasing the penetration rate, this technique has a widely recognized benefit of minimizing the damage caused by invasion of drilling fluid into the formation. Different underbalanced drilling equipment and techniques are discussed under this topic. The underbalanced well classification system used by the industry and several case studies are also covered in this presentation.

Duration:
4 hours 20 minutes

Course Code:
IHRDC_IPIMS_t23393

Content:

- Introduction to Underbalanced Drilling
- Dry Air Drilling
- Nitrogen Drilling
- Natural Gas Drilling
- Mist Drilling
- Foam Drilling
- Stiff Foam Drilling
- Gasified Liquids
- Flow-Drilling
- Snub Drilling
- Underbalanced Drilling: General Issues
- Case Studies
- Underbalanced Drilling: References and Additional Information

PETROLEUM ENGINEERING: Drilling Engineering

Drilling Problems and Drilling Optimization

Description:

Describes occurrences, preventive measures and remedial actions for common downhole drilling problems. Addresses considerations involved in drilling abnormal pressures, working in sour gas environments and planning fishing operations. Discusses procedures for optimizing bit hydraulics, bit weight and rotary speed to attain minimum cost drilling. Emphasizes importance of the mud system in meeting well objectives.

Duration:

3 hours 40 minutes

Course Code:

IHRDC_IPIMS_t119

Content:

- Drilling Objectives
- Pressure, Hydraulics and Hole Cleaning
- Abnormal Pressure Environments
- Kick Detection and Control
- Lost Circulation
- Borehole Instability
- Stuck Pipe
- Fishing Operations
- Hydrogen Sulfide
- Drilling Optimization
- Drilling Problems and Drilling Optimization: References and Additional Information

PETROLEUM ENGINEERING: Production Facilities Design

Oil Systems and Equipment

Description:

These presentations provide an understanding of two-phase and three-phase separators, describe how they work and what the design procedures are for sizing them. Then, different methods and procedures are described for oil treating and associated equipment design. Oil desalting is the process of removing water-soluble salts from an oil stream. This presentation describes the equipment commonly used and provides references for sizing the equipment. Crude oil or condensate stabilization describes the various processes used to stabilize a crude oil or condensate stream, and presents a preliminary method for determining liquid recoveries through stabilization.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t6433

Content:

- Two Phase Separators
- Three Phase Separators
- Oil Treaters
- Desalting
- Crude Stabilization
- Oil Systems and Equipment: References and Additional Information

Gas Systems and Equipment

Description:

Besides sales contract restrictions, several other reasons exist for the removal of acid components from natural gas streams. Among these are personnel safety, odor reduction, and fuel Btu improvement. The process of removing water vapor from a gas stream is called "gas dehydration. This presentation discusses conventional TEG dehydration and presents a method to size and design the glycol dehydration equipment. Compressors are used whenever it is necessary to flow gas from a low pressure system to a higher pressure system. This presentation provides guidelines on selecting the type of compressor to use for each application, determining power requirements, and designing the piping system associated with the compressor.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t6434

Content:

- Acid Gas Removal
- Glycol Dehydration
- Reciprocating Compressors
- Gas Systems and Equipment: References and Additional Information

PETROLEUM ENGINEERING: Production Facilities Design

Water Systems and Equipment

Description:

In production operations, it is often necessary to handle wastewater. The water must be separated from the oil and disposed of in an environmentally safe manner. This presentation describes the equipment used to separate, treat, collect, and dispose of wastewater, along with procedures for designing a water treating system consisting of skimmer tanks and vessels, plate coalescers, flotation units, and/or disposal piles. Information about equipment selection and sizing for removing suspended solids and dissolved gases from water is also provided.

Duration:
1 hour

Course Code:
IHRDC_IPIMS_t6435

Content:

- Treating Oil from Produced Water
- Removing Solids and Dissolved Gases from Produced Water
- Water Systems and Equipment: References and Additional Information

Utility Systems and Equipment

Description:

This topic presents information on fuel system design, providing guidelines for determining the facility fuel requirements and information on selecting equipment needed to treat fuels prior to use. Technical explanations on Fired heaters and their uses, along with guidelines for selecting and specifying a fired heater is presented. The next tutorial provides methods for determining the amount of waste heat energy available, and presents information and procedures on the design of a waste heat recovery system. Then, various components of refrigeration and heating systems are described, and a procedure is established for sizing evaporator duties, condenser duties, compressor horsepower, fan horsepower and duct sizes. In the last two subtopics, a basic understanding of reciprocating and centrifugal pumps is provided.

Duration:
2 hours 40 minutes

Course Code:
IHRDC_IPIMS_t6436

Content:

- Fuel Gas Systems
- Fired Heaters and Hydrate Control
- Heat Transfer Systems
- Waste Heat Recovery
- Heating, Ventilation, and Air Conditioning
- Reciprocating Pumps
- Centrifugal Pumps
- Utility Systems and Equipment: References and Additional Information

PETROLEUM ENGINEERING: Production Facilities Design

Instrumentation

Description:

This presentation covers the principles of control theory and the popular methods of implementation. Pressure, temperature and, flow measurement equipment types and their selection criteria is explained in detail. Different types and typical mounting practices for Level Instruments is presented. Control valves are described in terms of how to select the proper type of valve, suitable materials, and an appropriate size. Specifications and review of Safety Shutdown and Wellhead Control systems are covered in detail.

Duration:

3 hours

Course Code:

IHRDC_IPIMS_t6437

Content:

- Controllers and Control Theory
- Pressure Measurement and Control
- Temperature Measurement and Control
- Flow Measurement and Control
- Level Measurement and Control
- Control Valves
- Safety Shutdown Systems
- Wellhead Shutdown Systems
- Instrumentation: References and Additional Information

Platform and Structural Design Considerations

Description:

This presentation describes planning, designing, and arranging of equipment on offshore structures for the safe and efficient production of oil and gas. General criteria is provided for designing living quarters. This content also provides the project engineer with information for determining line size, wall thickness, and pressure rating class. Miscellaneous details to be considered in designing a piping system also are discussed.

Duration:

1 hour 20 minutes

Course Code:

IHRDC_IPIMS_t6438

Content:

- Offshore Facility Layout
- Living Quarters Layout
- Facilities Piping
- Platform and Structural Design Considerations: References and Additional Information

PETROLEUM ENGINEERING: Well Completion and Stimulation

Basic Completion Design and Practices

Description:
Introduces the key components, functional specifications, constraints and planning considerations involved in well completion design. Reviews the common types of completions and their areas of application. Describes the stages in the completion design process, the role of company policies, industry standards and regulatory requirements, and the typical tasks of a completions team.

Duration:
6 hours 48 minutes

Course Code:
IHRDC_IPIMS_t38755

Content:

- General Criteria for Completion Design
- Basic Downhole Configurations
- Lift Methods and Completion Design
- Specialized Completion Designs
- Completion Productivity and Injectivity
- Completion Planning

Cementing

Description:
Introduces the chemistry and classification of oil well cements. Discusses the use of additives, API testing requirements, and slurry flow properties. Describes cementing equipment, procedures, and evaluation techniques for primary and remedial cementing.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t37656

Content:

- Introduction to Cementing
- Chemistry and Classification of Oilwell Cements
- Cement Additives
- Cement Testing Procedures
- Cement Slurry Flow Properties and Mud Displacement
- Cementing Equipment
- Primary Cementing
- Squeeze Cementing
- Plug Cementing
- Cement Evaluation

PETROLEUM ENGINEERING: Well Completion and Stimulation

Completion Equipment

Description:

Well completion pertains to the equipment and procedures necessary to safely and efficiently bring a well on production or injection. This topic presents design and selection considerations for the equipment that makes up the lower completion, including tubulars, packers, seals and elastomers, along with downhole accessories for flowing and gas lift wells, positive displacement pumping systems and unconventional wells. The topic also describes the equipment that comprise the upper completion, including the wellhead, production or injection tree and associated flow control equipment.

Duration:
6 hours

Course Code:
IHRDC_IPIMS_t39209

Content:

- Completion Tubulars Overview
- Completion Tubulars Design
- Packers
- Seals and Elastomers
- Completion Equipment for Positive Displacement Pumping Systems
- Downhole Completion Accessories for Flowing and Gas Lift Wells
- Downhole Completion Accessories for Unconventional Wells
- Upper Completion

Perforating

Description:

Traces the evolution of perforating equipment and methods. Provides an overview of shaped charge operating principles, charge conveyance methods and charge carrier systems. Outlines commonly used perforating techniques and their areas of application. Describes basic design and operating considerations related to overbalanced vs. underbalanced perforating, detonation safeguards, depth control and perforating fluids. Examines the effects of key reservoir characteristics and well parameters on perforation performance and reviews the basic types of perforator tests recommended by the API RP 19B standard. Describes the major equipment components, job planning considerations and operating procedures involved in wireline perforating, tubing conveyed perforating, coiled tubing and pump-down perforating. Includes case studies illustrating the application of various perforating techniques.

Duration:
5 hours 20 minutes

Course Code:
IHRDC_IPIMS_t39862

Content:

- Introduction to Perforating
- Perforating Gun Types and API Testing Procedures
- Perforating and Production Performance
- Electric Wireline Perforating
- Tubing-Conveyed Perforating
- Coiled Tubing and Pump-Down Perforating

PETROLEUM ENGINEERING: Well Completion and Stimulation

Acidizing and Other Chemical Treatments

Description:
Introduces safe, cost-effective acid treatment design. Covers three basic treatments: acid washing, matrix acidizing and acid fracturing. Describes the costs and potential hazards of acidizing, and emphasizes proper justification and care in field procedures. Reviews fundamentals of acid chemistry and testing and field procedures.

Duration:
3 hours

Course Code:
IHRDC_IPIMS_t123

Content:

- Introduction to Acidizing
- Acid Treating Solutions
- Additives in Acidizing Fluids
- Matrix Acidizing
- Fracture Acidizing
- Diverting Materials in Acidizing
- Wellbore Cleanout and Scale Removal
- Paraffins and Asphaltenes
- Acidizing and Other Chemical Treatments: References and Additional Information

Hydraulic Fracturing

Description:
Introduces fundamental concepts of hydraulic fracturing and describes the tools, equipment, materials and procedures involved in hydraulic fracturing treatments. Discusses theoretical and practical aspects of job design, execution and evaluation, including case studies and examples of successful treatments.

Duration:
6 hours 30 minutes

Course Code:
IHRDC_IPIMS_t38524

Content:

- Hydraulic Fracturing Fundamentals
- Hydraulic Fracturing Fluids
- Proppants
- Fracturing Equipment and Operations
- Fracture Treatment Design
- Hydraulic Fracturing Treatment Evaluation

PETROLEUM ENGINEERING: Well Completion and Stimulation

Sand Control

Description:

Covers sand control topics from rock mechanics to equipment. Emphasizes estimation and control methods. Presents gravel-pack design and placement procedures in detail, describing surface equipment used, as well as downhole screens and associated equipment.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t125

Content:

- Sand Production in Oil and Gas Wells
- Completion and Production Practices
- Liners and Screens
- Gravel Packing
- Frac-and-Pack Techniques
- Consolidation Techniques
- Sand Control in Wells Producing Heavy Oil
- Sand Control: References and Additional Information

Horizontal Wells: Completion and Evaluation

Description:

Introduces the deliverability equation for horizontal wells. Compares horizontal and vertical well performance. Identifies formation characteristics that favor horizontal wells, and discusses methods for their determination. Describes basic well configurations and completion designs. Looks at practical aspects of cementing, zonal isolation, casing design and sand control. Address guidelines for matrix acid treatments and hydraulic fracture stimulations.

Duration:

2 hours

Course Code:

IHRDC_IPIMS_t126

Content:

- Horizontal Wells in a Reservoir Management Strategy
- Horizontal Well Completions
- Matrix Stimulation of Horizontal Wells
- Hydraulic Fracturing of Horizontal Wells
- Horizontal Wells: Completion and Evaluation: References and Additional Information
- Multilateral, Multibranched and Multilevel Wells

PETROLEUM ENGINEERING: Reservoir Engineering

Fundamentals of Reservoir Engineering

Description:
Introduces fluid flow and natural drive mechanisms. Describes basic reservoir engineering goals and the tools and resources employed by reservoir engineers. Describes the behavior of gas and gas condensate reservoirs, using the real gas equation of state and the P/Z versus cumulative production approaches. Discusses major drive mechanisms and the calculation of OIP using material balance equations.

Duration:
1 hour

Course Code:
IHRDC_IPIMS_t986

Content:

- Basic Concepts in Reservoir Engineering
- Reservoir Fluid Flow and Natural Drive Mechanisms
- Fundamentals of Reservoir Engineering: References and Additional Information

Reservoir Environments and Characterization

Description:
Introduces important depositional environments and processes. Explains the geological, geophysical and engineering information vital to reservoir characterization, and its use in reservoir management.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t984

Content:

- Sandstone Reservoir Environments
- Carbonate Reservoir Environments
- Reservoir Characterization
- Reservoir Environments and Characterization: References and Additional Information

Improved Recovery Processes

Description:

Secondary Recovery: Waterflooding & Gas Injection
Introduces the fundamental principles governing the displacement of oil by water in reservoir rocks, as well as techniques for predicting oil recovery by water and gas injection. Describes the important factors to consider in planning secondary recovery projects.

Enhanced Recovery: Miscible Flooding
Introduces the physical and chemical processes governing the recovery of oil by miscible displacing agents. Contains extensive discussion of methods for estimating oil recovery. Describes the considerations involved in designing a miscible flood, and illustrates these considerations by reviewing a number of pilot tests and commercial projects.

Duration:
3 hours

Course Code:
IHRDC_IPIMS_t987

Content:

- Secondary Recovery: Waterflooding and Gas Injection
- Enhanced Recovery: Miscible Flooding
- Improved Recovery Processes: References and Additional Information

Reservoir Simulation

Description:
Introduces the concepts of reservoir modeling, and outlines the steps involved in a reservoir simulation study. Reviews rock properties, fluid properties and the mathematical description of fluid flow dynamics in porous media. Describes computer methods for setting up a numerical model and solving flow equations. Discusses practical applications of reservoir modeling, including the use of special purpose simulators.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t39748

Content:

- Introduction to Reservoir Simulation
- Reservoir Model Parameters
- Fluid Flow Equations
- Solution Methods for Reservoir Fluid Flow Equations
- Simulation Studies
- References and Additional Information

PETROLEUM ENGINEERING: Reservoir Engineering

Issues in Reservoir Management

Description:

Evaluation of Naturally Fractured Reservoirs
Discusses the origin and classification of natural fractures, and outlines methods for detecting and characterizing them. Discusses how the properties of fractured formations affect reservoir engineering considerations. Outlines general approaches to modeling fractured reservoirs, illustrating these approaches with several case studies.

Reservoir Management of Mature Fields
Introduces the concept of synergism in reservoir management, stressing an interdisciplinary approach as key to maximizing a field's potential. Outlines data requirements and methodology for evaluating a mature reservoir. Discusses applied reservoir management from the standpoint of increasing reserves and monitoring performance, with special emphasis on waterflooding and enhanced oil recovery projects.

Duration:
7 hours

Course Code:
IHRDC_IPIMS_t991

Content:

- Evaluation of Naturally Fractured Reservoirs
- Reservoir Management of Mature Fields
- Issues in Reservoir Management: References and Additional Information

Resources and Reserves Estimation

Description:
Introduces reserves estimation methodologies and the industry definitions used to categorize reserves. Illustrates principal methods of calculation: analogy/statistical, volumetrics, material balance and performance trend analysis. Presents special considerations for estimating reserves in unconventional, fractured, overpressured, heavy oil, low permeability and water-drive gas reservoirs.

Duration:
4 hours 30 minutes

Course Code:
IHRDC_IPIMS_t39498

Content:

- Introduction to Resources and Reserves
- Resources and Reserves Classification Systems and Definitions
- Analog and Volumetric Methods for Resources and Reserves
- Estimation
- Performance Methods for Estimating Reserves
- Issues in Reserves Estimation Reserves
- Estimation Case Studies

PETROLEUM ENGINEERING: Offshore Operations

Offshore Production Facilities

Description:

Starting with a broad look at the offshore oil and gas industry, including its history, current scope, trends, challenges and an overview of regulatory environments, this Topic examines the primary design considerations for offshore production facilities and identifies key drivers and decision factors in offshore project development. It goes on to describe the various types of platforms, surface components and subsea production facilities: their design features, equipment components operating considerations and areas of application. Included are discussions of offshore pipelines, production equipment and operations, and requirements for decommissioning and removal of offshore facilities. The presentation concludes with case studies of deepwater operations in West Africa and the Gulf of Mexico.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t36282

Content:

- Overview Of The Offshore Petroleum Industry
- Primary Design Considerations For Offshore Production Facilities
- Development Project Drivers And Key Decision Factors
- Platforms And Surface Facilities
- Subsea Production Facilities
- Offshore Pipelines
- Offshore Production Equipment And Operations
- Decommissioning And Removal Of Offshore Facilities
- Offshore Development: Case Studies
- Offshore Production Facilities: References and Additional Information

Deepwater Drilling

Description:

The term "deepwater" has always been defined in terms of where offshore technology stood at a given moment. In the early 1960s, 500-foot water depths placed a practical limit on offshore drilling capabilities; by 2003, the water depth record had surpassed 10,000 feet. This Topic describes the equipment and technology that have made such advances possible. Starting with an overview of worldwide drilling activity, it looks at the characteristics of deepwater environments and the challenges they pose with respect to rig requirements and offshore project management. It goes on to discuss the systems, equipment and considerations involved in deepwater well planning, design and construction. It then examines some of the innovative solutions to deepwater drilling challenges, ranging from riserless drilling to dual activity operations. Finally, it presents several case studies to show how these solutions have been applied in the Gulf of Mexico, offshore eastern Canada and the North Sea.

Duration:
2 hours 20 minutes

Course Code:
IHRDC_IPIMS_t36797

Content:

- Deepwater Projects And Environments
- Deepwater Drilling Systems And Equipment
- Deepwater Well Planning And Design
- Deepwater Well Construction
- Advanced Solutions For Deepwater Drilling Challenges
- Deepwater Case Histories
- Deepwater Drilling: References and Additional Information

PETROLEUM ENGINEERING: Petroleum Economic Analysis and Fundamentals

Energy Project Economics and Risk Analysis

Description:

Project Economics and Risk Analysis presents the process energy companies follow to analyze the economic attractiveness of capital investments, whether it is an investment in oil and gas exploration, a new power plant or LNG facility, a new refinery, or simply the capital expansion of an existing facility. The analysis includes three basic ways to incorporate uncertainty into the calculation of project metrics: Deterministic estimates, Spider and Tornado Diagrams, and Monte Carlo Simulation.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t37308

Content:

- Introduction
- Cash Flow
- Future and Present Value Analysis
- Present Value of a Project
- Calculating the Internal Rate of Return of a Project
- Risk Analysis
- Impact of Debt Financing (Leverage) on Project Economics
- Summary of Financial Results

Risk Analysis Applied to Petroleum Projects

Description:

Introduces concepts of risk and uncertainty as they apply to the oil and gas industry. Describes risk analysis models, measures of profitability and other decision-making tools. Reviews principles of probability distribution and introduces the Monte Carlo simulation model. Presents procedures for running simulation models. Discusses the roles of competitive bidding and enterprise risk management in the petroleum industry.

Duration:
4 hour 30 minutes

Course Code:
IHRDC_IPIMS_t39481

Content:

- Risk Analysis Fundamentals
- Probability Distributions
- Monte Carlo Simulation Models
- Competitive Bidding and Enterprise Risk Management

PETROLEUM ENGINEERING: Other Petroleum Engineering Topics

Natural Gas Fluid Properties

Description:
Introduces basic concepts, instrumentation and terminology used in natural gas engineering. Reviews characteristics of natural gas fluid systems. Describes devices for measuring temperature, pressure, volume, flow rate, density and other properties, and discusses well selection, conditioning and sampling procedures. Outlines methods for measuring mass flow rates and determining mixed-stream compositions.

Duration:
3 hours 20 minutes

Course Code:
IHRDC_IPIMS_t141

Content:

- Natural Gas Fluid Systems
- Natural Gas Fluid Properties
- Temperature Measurement
- Pressure Measurement
- Volume and Flow Rate Measurement
- Gravity/ Density Measurement and Gas Composition
- Natural Gas Fluid Sampling
- Mass Flow Rate
- Mixed Stream Composition
- Natural Gas Fluid Properties: References and Additional Information

Oil and Gas Pipelines

Description:
This topic covers the engineering design and construction aspects of oil and gas pipelines. Discusses pipeline history, key design considerations (including hydraulic calculations and mechanical strength), onshore and offshore constructions practices, cost estimating, current operating practices and potential operating problems.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t5723

Content:

- Overview of Oil and Gas Pipelines
- Hydraulics
- Mechanical Design
- Construction
- Operations
- Oil and Gas Pipelines: References and Additional Information

PETROLEUM ENGINEERING: Other Petroleum Engineering Topics

Integrated Reservoir Characterization

Description:

Integrated Reservoir Characterization pulls together data and talents from a number of disciplines to optimize field production. This topic describes the contributions of the geologist, geophysicist, petroleum engineer, and petrophysicist as they combine data and interpretations to build a comprehensive model of the reservoir.

Duration:

3 hours 40 minutes

Course Code:

IHRDC_IPIMS_t5858

Content:

- Introduction to Integrated Reservoir Characterization
- Assembly and Review of Existing Data
- Data Acquisition
- Data Analysis and Interpretation
- Data Integration
- Conclusion
- Recommended Processes
- Case Study 1 - Anasazi Field
- Case Study 2 - Yibal Field
- Integrated Reservoir Characterization: References and Additional Information
- Integrated Reservoir Characterization: Exercises

FORMATION EVALUATION: Well Logging

Overview of Formation Evaluation

Description:

Introduces the scope, objectives and main methods of formation evaluation, especially LWD and wireline well logging, core acquisition and analysis, and well testing. Discusses the measurements of rock and fluid properties such as porosity, absolute and relative permeability, formation resistivity, fluid saturation, petrophysical parameters and the effects of drilling mud filtrate invasion on the formations near the wellbore. Describes the main core acquisition processes and subsequent common routine and special core analysis (SCAL) techniques. Overviews the objectives and some basic methods of well testing and analysis, and the integration of the well test analysis with other subsurface data.

Duration:
6 hours

Course Code:
IHRDC_IPIMS_t38928

Content:

- Fundamentals of Formation Evaluation and the Subsurface Environment
- Fundamentals of Rock and Fluid Properties and Their Measurement by Logging Tools
- Fundamentals of Laboratory Measurements of Rock and Fluid Properties
- Fundamentals of Well Testing and Analysis

Logging Equipment and Operational Procedures

Description:

Logging while drilling (LWD) and wireline logging set-up processes, equipment, tool conveyance, data transmission and operational procedures are reviewed. The features and functions of common LWD and wireline logging tools are summarized. LWD and wireline logging operations are compared, facilitating logging program design. Well log quality control techniques are discussed.

Duration:
3 hours 30 minutes

Course Code:
IHRDC_IPIMS_t38993

Content:

- Wireline Logging Equipment
- Wireline Logging Operational Procedures
- Logging while Drilling (LWD) Equipment and Operational Procedures

FORMATION EVALUATION: Well Logging

Well Logging Tools and Techniques

Description:
Presents the commonly used logging tools--SP, gamma ray, resistivity and porosity--and their characteristics and functions including coverage of Magnetic Resonance Logging. Examines the interaction of rocks and fluids in both static and dynamic situations.

Duration:
4 hours 40 minutes

Course Code:
IHRDC_IPIMS_t29948

Content:

- Magnetic Resonance Logs
- Spontaneous Potential Log
- Gamma Ray Log
- Resistivity Logs
- Dielectric Logs
- Density Logs
- Neutron Logs
- Acoustic Logs
- Special Open Hole Tools
- Cased Hole Logs
- Casing Inspection Logs
- Production Logs
- Sampling and Testing
- Well Logging Tools and Techniques: References and Additional Information

Borehole Imaging

Description:
Advanced imaging technologies provide high-resolution information about lithology, structure, sedimentary features and borehole conditions. This Topic describes the operating principles, applications and limitations of acoustic and resistivity imaging tools, and illustrates how you can use borehole imaging as a reservoir monitoring and characterization tool.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t5610

Content:

- Borehole Imaging Overview
- Borehole Imaging Technology
- Borehole Imaging Methods
- Borehole Imaging References and Additional Information
- Best Practices
- Borehole Imaging: Exercises

FORMATION EVALUATION: Well Logging

Well Log Interpretation

Description:

Explains commonly used log analysis techniques and formulas. Demonstrates the use of logging tools to evaluate porosity, lithology and saturation. Presents computer applications, methods and models and combines the various tools and measurements in a concluding case study.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t39680

Content:

- Fractures
- Interpretation Models
- Computer Applications
- Advances in Low Resistivity Pay Evaluation
- Well Log Interpretation: Reference Section

Dipmeter Surveys

Description:

Dipmeter data is an important component of the database used in integrated subsurface interpretations. Computed dipmeter data provides geoscientists with critical geological insight, especially when combined with other well and seismic data, to help evaluate the subsurface environment. This topic, Dipmeter Surveys, discusses dipmeter logging tools, data acquisition, data processing, display and interpretation of computed dipmeter data, as well as applications for unconventional resource reservoirs.

Duration:
7 hours

Course Code:
IHRDC_IPIMS_t38387

Content:

- Dipmeter Overview
- Dipmeter Logging Tools
- Raw Dipmeter Data Processing
- Display of Formation Dip and Image Data
- Dipmeter Interpretation of the Geological Structure
- Dipmeter Interpretation in Various Depositional Environments
- Dipmeter Applications for Unconventional Resource Reservoirs

FORMATION EVALUATION: Well Logging

Well Log Interpretation Essentials

Description:

Explains commonly used standard and quick-look log analysis techniques. Demonstrates the interpretation of LWD and wireline logs to determine the shale volume, lithology, porosity and fluid saturation. Presents well log interpretation techniques suitable for both individual well analysis and field studies.

Duration:

5 hours 30 minutes

Course Code:

IHRDC_IPIMS_t39562

Content:

- Quick-Look Interpretation
- Shale Content
- Porosity
- Lithology
- Fluid Saturation
- Field Studies

FORMATION EVALUATION: Well Testing and Analysis

Fundamentals of Well Testing

Description:
Introduces the theory of pressure-transient analysis. Illustrates the measurement devices used to detect and record pressures during well testing. Presents fundamentals of well sampling and testing.

Duration:
2 hours

Course Code:
IHRDC_IPIMS_t127

Content:

- Introduction to Fundamentals of Well Testing
- Pressure Profiles at the Wellbore
- Defining the Reservoir Model
- Quantitative Well Test Interpretation
- Well Test Planning and Execution
- Fundamentals of Well Testing: References and Additional Information

Gas Well Testing

Description:
Presents the fundamental theory and mathematical basis for determining gaswell performance from well test data. Outlines field testing procedures and interpretation methods.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t128

Content:

- Conventional and Isochronal Gas Well Tests
- Additional Testing Options
- Special Considerations in Testing Gas Wells
- Test Procedures and Regulations (Examples)
- Gas Well Testing: References and Additional Information

FORMATION EVALUATION: Well Testing and Analysis

Oil Well Testing

Description:
Reviews the mathematical basis for different types of well tests and interpretation procedures for well test data, including buildup and drawdown tests, multiple rate tests, interference and pulse testing.

Duration:
1 hour 40 minutes

Course Code:
IHRDC_IPIMS_t129

Content:

- Basics of Pressure Transient Analysis
- Log-log Analysis
- Test Design
- Test Analysis
- Oil Well Testing: References and Additional Information

Drillstem Testing

Description:
Introduces equipment and procedures for drillstem testing. Describes basic tool assemblies and operating procedures for fixed and floating rig testing. Illustrates qualitative and quantitative analysis of drillstem test data.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t130

Content:

- Overview of Drillstem Testing
- Types of Drillstem Tests
- Tool String: Conventional DST (Open Hole)
- Tool String: Other DST Types
- Testing on Floating Vessels
- Pressure Recorders for DSTs
- Surface DST Equipment
- DST Design and Field Procedures
- DST Interpretation: General Aspects
- DST Interpretation: Qualitative Analysis
- DST Interpretation: Quantitative Analysis
- Drillstem Testing: References and Additional Information

FORMATION EVALUATION: Well Testing and Analysis

Advanced Pressure Transient Analysis

Description:

This presentation examines in detail the mathematical basis for well test interpretation, starting with the concept of an ideal reservoir model and the partial differential equations used to describe single-phase and multi-phase flow in porous media. It discusses the use of dimensionless variables and type curves in pressure transient analysis, and describes interpretation methods for anisotropic, hetereogenous and multi-phase reservoirs. It also provides an overview of computer applications in pressure transient analysis, discusses specialized well testing procedures and their applications, and describes mathematical tools used in pressure transient analysis, including Transformations, applications of the Superposition Principle, Convolution/Deconvolution Methods, and Pressure Derivative Analysis.

Duration:
4 hours

Course Code:
IHRDC_IPIMS_t24035

Content:

- Pressure Transient Testing: Overview
- Differential Flow Equations for Pressure Transient Analysis
- Dimensionless Variables and Their Applications
- Type Curves
- Pressure Transient Analysis in Anisotropic Reservoirs
- Pressure Transient Analysis in Heterogeneous Reservoirs
- Pressure Transient Analysis in Multi-Phase Reservoirs
- Pressure Transient Analysis-Computer Applications
- Pressure Transient Analysis-Specialized Well Testing Techniques
- Pressure Transient Analysis-Mathematical Tools
- Advanced Pressure Transient Analysis: References and Additional Information
- Well Testing Nomenclature and Systems of Units

FORMATION EVALUATION: Rock and Fluid Sampling and Analysis

Coring

Description:

Describes the geological and engineering objectives of, and the design considerations for, a coring program. Discusses the effect of the borehole environment on coring, and how to select the appropriate coring fluid. Compares and contrasts conventional full diameter coring with percussion and rotary sidewall coring. Describes the optimal core sample handling and shipping procedures to preserve representative reservoir rock samples for laboratory analyses.

Duration:

3 hours

Course Code:

IHRDC_IPIMS_t39073

Content:

- Introduction to Coring
- Borehole Environment
- Full Diameter Conventional Coring
- Sidewall Coring

Fluid Sampling and Analysis

Description:

Reviews basic properties of hydrocarbon reservoir fluids and formation water. Illustrates phase behavior, PVT properties, and categorization of reservoir fluids. Describes equipment and procedures for laboratory analyses and fluid sampling including surface and subsurface techniques. Presents correlations used to estimate reservoir fluid behavior.

Duration:

4 hours 20 minutes

Course Code:

IHRDC_IPIMS_t999

Content:

- Reservoir Fluids: Overview
- Hydrocarbon Phase Behavior
- Hydrocarbon Gases
- Hydrocarbon Liquids
- Two-Phase Systems
- Formation Water
- Fluid Sampling: General Considerations
- Hydrocarbon Sampling
- Water Sampling
- Sampling: Transportation and Safety
- Reservoir Fluid Analysis
- Reservoir Fluid Correlations
- Fluid Sampling and Analysis: References and Additional Information

FORMATION EVALUATION: Rock and Fluid Sampling and Analysis

Core Analysis

Description:
Presents a comprehensive review of core analysis procedures and equipment, including sample preparation, routine core analysis, special core analysis (SCAL), core description, core photographs as well as complementary core information. Provides examples of typical core analysis data and reports.

Duration:
6 hours 18 minutes

Course Code:
IHRDC_IPIMS_t39265

Content:

- Introduction to Core Analysis
- Core Sample Preparation
- Porosity Measurement
- Permeability Measurement
- Fluid Saturation Determination
- Core Description
- Complementary Core Information
- Core Reports
- Special Core Analysis (SCAL)

Sampling and Analysis of Drilled Cuttings

Description:
Rock cuttings from drill bits can be the most reliable source of information available at a wellsite. Presents the procedures and responsibilities involved in wellsite evaluation of cuttings and cores. Emphasizes attention to quality control in the collection, preparation, and storage of cuttings and cores to ensure laboratory analysis accurately measures subsurface conditions.

Duration:
1 hour 20 minutes

Course Code:
IHRDC_IPIMS_t29

Content:

- Rotary Drilling and Cuttings Generation
- Sample Collection and Handling
- Sample Description
- Sampling and Analysis of Drilled Cuttings: References and Additional Information

FORMATION EVALUATION: Rock and Fluid Sampling and Analysis

Mud Logging

Description:

Demonstrates the techniques of conventional mud logging during the preparation of a formation log and accompanying event reports. Presents the rate-of-penetration curve, lithology plot, total gas curve, gas composition curves and descriptive track. Also discusses the use of mud logging in overpressure recognition, hydrocarbon evaluation and non-hydrocarbon gas detection. Summarizes computer-based data acquisition and measurement-while-drilling techniques.

Duration:

2 hours 40 minutes

Course Code:

IHRDC_IPIMS_t997

Content:

- Introduction to Mud Logging
- Conventional Mud Logging Practices
- Penetration Rate and Lithology
- Gas Measurement and Analysis
- Supplemental Logging Techniques and Applications
- Advanced Mud Logging and Advisory Practices
- Selection of Services and Equipment
- Mud Logging: References and Additional Information

MULTI-DISCIPLINARY: Unconventionals

Introduction to Unconventional Resources

Description:

This topic reviews the categories of unconventional oil and gas resources such as shale reservoirs, tight gas sands, coal bed methane, and heavy oil. Development, field development, and specialized processes applied to each of these categories are also discussed. Finally, the estimation of available resources and reserves estimations is examined for each category and several case studies are provided.

Duration:

7 hours

Course Code:

IHRDC_IPIMS_t38835

Content:

- Introduction to Unconventional Resource Types
- Introduction to Unconventional Resource Development
- Shale Reservoirs
- Tight Gas Sands and Their Development
- Coal Bed Methane Reservoirs and Their Development
- Extra-Heavy Oil Resources

IHRDC

International Human Resources Development Corporation

IPIMS Action Learning

Upstream Technology e-Learning

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Drilling and Well Completion Practices

Drilling, Workover and Well Servicing

Action Learning: Production Engineering and Operations

Production Fundamentals

Production and Operating Practices

EXPLORATION: Basin Analysis

Sedimentology

Description:

After completing this course, the user will be able to: identify sedimentary rocks and processes from such information as outcrops, core reports, well logs and cuttings, describe sedimentary and diagenetic processes, define depositional environments and facies architecture within the context of basin analysis, describe the role of petrographic studies, such as XRD, SEM and thin-section analysis in sedimentology, and use core and outcrop data to define lithofacies and depositional environments in terms of composition, texture, geometry and sedimentary structure. The learner will also be able to: use core data and well logs to construct lithostratigraphic columns, infer depositional environments and build geologic cross-sections, and review facies trends and extrapolate them to a regional scale. Use sedimentological interpretations as a basis for building facies and net-to gross sand maps.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a480

Content:

- Outcrop description
- Integration of core analysis
- NW-SE Correlation of selected wells
- Map of sedimentary paleoenvironments
- Net sand map construction

EXPLORATION: Basin Analysis

Sequence Stratigraphy

Description:

After completing this module, the learner will be able to: outline principle genetic types of deposits used in sequence stratigraphy (e.g., normal regressive, forced regressive, transgressive, and still stand.), define stratigraphic cross-sections based on sequence stratigraphy concepts, predict reservoir occurrences based on an understanding of the relationships between accommodation space, sediment supply, stacking patterns and unconformities, and interpret stratigraphic evolution in a basin.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a481

Content:

- Depositional environments and related facies
- Core information
- Chronostratigraphic framework
- Sequence Stratigraphy Principles
- Stratigraphic X-section based on sequence stratigraphy concepts

EXPLORATION: Basin Analysis

Seismic Sequence Stratigraphy

Description:

After completing this course, the learner will be able to: explain key concepts of seismic sequence stratigraphy and the techniques used to evaluate the seismic data, establish the major sequences and flooding surfaces for basic sequence analysis, integrate available well, biostratigraphic and outcrop data into the framework, determine depositional environment and facies, and use seismic data to interpret depositional sequences.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a482

Content:

- Identification and Description of Sequence Boundaries
- Identification of System Tracts
- Correlation of Sequence Boundaries and Flooding Surfaces
- Relationship of seismic facies and equivalent lithofacies
- Prediction of potential source; reservoir and seal rocks

EXPLORATION: Basin Analysis

Biostratigraphy

Description:

Use plant and animal fossils from cuttings, cores or outcrops to distinguish among rock units, determine their ages and infer the sedimentary environment. Upon completing this course, the user will be able to: describe the different classes of microfossils and their use, infer sedimentary environments based on occurrences, identification and classification of microfossils, use microfossils as a basis for estimating the ages of rock units, demonstrate the use of abundance and diversity charts, and use microfossils as a basis for correlating rock units between two wells.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a483

Content:

- Biostratigraphic Zonations
- Microfossils; biozonation and age interpretation
- Biostratigraphic correlation
- Maps of Paleoenvironment interpretation
- Correlation with sea level curves

EXPLORATION: Basin Analysis

Petroleum Geochemistry

Description:

Understand geochemical concept of origin and occurrence of petroleum. Describe its composition and classification of oil and gas. Identify source rock based on geochemical analysis. Understand correlation of source rock with subsurface hydrocarbon accumulation. Upon completion of this course, the learner will be able to: understand composition and classification of oil and gas, understand types of kerogen, generation, expulsion and migration of petroleum, describe principal tools and methods for evaluation of source rock, interpret source rock quality and maturity, and evaluate 1-D maturation model.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a484

Content:

- Evaluation of source rock quality and maturity
- Description of thermal maturity and organic matter quality
- Oil-Source rock correlation
- Integration of geological and geochemical data
- Evaluation of 1-D geochemical model

EXPLORATION: Dynamics of Deformation

Tectonics

Description:

Determine global tectonic setting based on age and paleogeographic maps. Recognize resulting basin and its evolution. Illustrate structural styles determined by this tectonic setting. Upon completing the course, the learner will be able to: determine plate tectonic history for prospective geographic area and age, describe basin development and evolution based on tectonic setting, define potential structural styles based on tectonic setting, and identify potential hydrocarbon traps resulting from a structural style.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a521

Content:

- Global Plate Tectonics
- Caribbean Plate Tectonics
- Tectonic Evolution- Maracaibo Basin
- Paleogeographic evolution - Maracaibo Basin
- Hydrocarbon traps resulting from a structural style
- Associated faulting related to trap formation
- Types of faulting and fault displacement
- Trap formation and Plate tectonics

EXPLORATION: Dynamics of Deformation

Structural Geology

Description:

Identify and interpret different structural styles in their tectonic setting using geologic maps, cross sections, seismic and well log data. Analyze and predict potential trapping configurations based on the structural style. Evaluate the effect of structural style on the overall petroleum system. Upon completing the course, the learner will be able to: use surface maps, subsurface maps, cross sections and logs to identify and interpret structural styles, predict the potential types of faults and folds associated with a structural style, understand key characteristics of different types of faults and folds, and determine different trapping mechanisms which result from different structural styles.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a522

Content:

- Structural Evolution of the north-central Maracaibo Basin
- Structural styles of deformation
- Structural trapping mechanisms
- Hydrocarbon traps resulting from a structural style
- Structures associated with wrench faults

EXPLORATION: Dynamics of Deformation

Rock Properties and Mechanics

Description:

Identify rock mechanical properties from core, cuttings and electrical logs. Use analysis to address issues related to fractures, subsurface pressures, subsidence and compaction. Illustrate an understanding of rock properties that effect seismic response. Upon completing this course, the learner will be able to: define basic rock mechanical properties, describe how they are measured, understand the differences between laboratory measurements and in-situ properties, predict formation subsurface pressure environment and principal stress directions, and define properties that effect seismic response and how these properties relate to AVO effect.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a520

Content:

- Elastic modulus static characterization.
- Elastic modulus dynamic characterization.
- Subsurface stress-strain characterization.
- Fluid Substitution.
- Storage and Transport Properties.
- Rock Mechanics and acoustic impedance.

EXPLORATION: Surface Geology and Reconnaissance

Surface Geology

Description:

Identify surface geologic units and tectonic elements with a geologic map. Demonstrate the use of cross sections in conjunction with geologic maps. Upon completing this course, the learner will be able to: demonstrate ability to read surface geological maps, illustrate relationship between a cross section and geological map, locate a particular rock unit on a surface geology map and define that unit's geographic distribution, demonstrate understanding of an outcrop description and find rock units on a geological map, and understand various cross-section preparation techniques and factors influencing their choice.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a560

Content:

- Read surface geologic maps
- Evaluate cross sections with a geologic map
- Analyze geographic distribution of a rock unit
- Combine outcrop description with geologic map

EXPLORATION: Surface Geology and Reconnaissance

Remote Sensing

Description:

Demonstrate understanding of different remote sensing data and its application to exploration. Use remote sensing techniques to identify geomorphological and structural characteristics. Demonstrate knowledge of how remote sensing can identify surface hydrocarbon anomalies. Upon completion of this course, the learner will be able to: use satellite imagery to identify geographical and geological elements on the Earth surface, identify simple structural styles based on remote sensing data, use remote sensing data to locate hydrocarbon seeps, and analyze regional structural styles from remote sensing images in order to identify potential areas for exploration.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a562

Content:

- Digital Processing of Images
- Geological and Geomorphologic Interpretation
- Selection of Radar Images
- Interpretation of Radar Images

EXPLORATION: Surface Geology and Reconnaissance

Geodetic Coordinate Systems

Description:

Understand the differences between coordinate systems and the variables that define them. Recognize the need to convert data from one system to another. Determine the most appropriate cartographic system for the area of interest. Upon completion of this course, the learner will be able to: distinguish between different coordinate systems, list variables necessary to define a coordinate systems, identify strengths and weakness of different coordinate systems, describe work flow to establish coordinate system of different data types, describe the Global Positioning System and how it is used in determining geodesic positions, and review and convert cartographic data and maps to the most applicable geographic system.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a563

Content:

- Identification of Coordinate Systems for surface map representation
- Identification of surveying techniques
- Determination of transformation parameters for the local datum
- Coordinate Transformation

EXPLORATION: Surface Geology and Reconnaissance

Magnetostratigraphy, Chemostratigraphy, and Radiometric Dating

Description:

Understand principles and techniques of magnetostratigraphy, chemostratigraphy and radiometric dating. Describe the practical application of these techniques in non-fossiliferous rock units. Explain how they provide pertinent information in petroleum exploration. Upon completion of this course, the learner will be able to: describe the basic principles and techniques used in magnetostratigraphy, describe the basic principles and techniques used in chemostratigraphy, describe the basic principles and techniques used in radiometric measurements, demonstrate an understanding of the geologic reasons to apply these techniques, incorporate these dating techniques with outcrop and surface geological maps, understand dating techniques for subsurface samples like conventional cores, and understand advantages and disadvantages of each dating technique.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a561

Content:

- Performing a Magnetostratigraphic study
- Performing a Radiometric Dating study
- Chemostratigraphic correlation
- Chemostratigraphic study using Sr isotope

EXPLORATION: Surface Geology and Reconnaissance

Gravity, Magnetic, and Electromagnetic Exploration Methods

Description:

Recognize uses and limitations of gravity, magnetics and electromagnetic (EM) methods of exploration. List survey design criteria for each technique. Estimate the thickness of the sedimentary section of a basin using different data types. Upon completing this course, the learner will be able to: describe the basic principles and tools used in gravity, magnetic and electromagnetic techniques, identify main exploration application for gravity, magnetics and electro-magnetic surveys, and outline design considerations of gravity, magnetic and electromagnetic surveys, and apply basic interpretation techniques to determine depth to basement.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a564

Content:

- Planning a Gravity Survey
- Interpreting Gravity Data
- Planning a Magnetic Survey
- Interpreting Magnetic Data
- Using the Magneto-Telluric Method
- Aquifer Detection and Characterization

EXPLORATION: Seismic Methods

Seismic Data Acquisition

Description:

Select the most favorable seismic acquisition configuration for the area of interest. Select source and receiver array for proposed survey. Evaluate trade-off between 2-D and 3-D acquisition for the exploration objective. Upon completion of the course, the learner will be able to: understand the primary principles of seismic survey design, identify the basic concepts and field operations involved in seismic data acquisition, contrast differences between 2-D and 3-D acquisition, describe key elements of marine vs. non-marine acquisition, evaluate horizontal and vertical seismic resolution, and evaluate practical considerations in survey design.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a600

Content:

- Analyzing the prospect
- Areal Extent
- Group and Source Intervals
- Marine Constraints

EXPLORATION: Seismic Methods

Geophysical Instrumentation

Description:

Evaluate the physical mechanics of source and receivers. Describe receivers and possible receiver configurations depending on noise. Review application of field testing. Evaluate basic recording instrument types. Incorporate quality control during data collection. After completing the course, the learner will be able to: describe different types of seismic sources, receivers and their applications, identify the most common types of recording instruments, identify the most common types of restrictions that limit configuration of a seismic program, describe different data formats for the acquisition process, and propose a work flow to monitor and maintain quality control over seismic acquisition procedures.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a601

Content:

- The Source
- The Receivers
- Recording Devices
- Data Formats
- Quality Control

EXPLORATION: Seismic Methods

Seismic Survey Design

Description:

Describe environmental factors that require modification to normal marine/non-marine seismic data acquisition. Include access, water depth, surface terrain, noise and obstructions. Indicate appropriate source, receiver or geometries considerations for each case. List non-conventional seismic survey types and their application. List non-conventional source and receiver types and their application. List source and receiver limitations for a transition zone seismic survey. Describe possible shooting solutions for seismic acquisition in an existing field with obstructions. Describe exploration reasons for shear wave acquisition.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a607

Content:

- Project #1: Choosing source and receivers in transition zones
- Project #1: Implementation techniques and limitations
- Project #2: Choosing source and receivers in access limited areas
- Project #2: Shooting solutions in zones with limited access and obstacles.
- Project #3: Identify important aspects of shear wave acquisition

EXPLORATION: Seismic Methods

Seismic Data Processing

Description:

Design the seismic processing sequence by selecting the appropriate processing methods. Perform the data processing and quality control, and work with the interpreter to make sure that the outcome truly reflects the geological characteristics of the area. Describe the basic seismic processing sequence from pre-processing and deconvolution through stacking and velocity analysis, to migration and post-processes. Understand the application of different types of deconvolution, velocity analyses and migration techniques. Review processing steps in the context of the objectives of the seismic interpretation.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a602

Content:

- Initial processes
- Deconvolution and filtering
- Velocity analysis and NMO correction
- Static correction and Residual correction
- Stacking and Seismic Migration

EXPLORATION: Seismic Methods

Wellbore Seismic

Description:

Evaluate the applicability of wellbore seismic technology to a particular well. Determine the need for check shot survey, synthetic seismogram, vertical seismic profiling (VSP) and cross-well tomography. Use seismic sections, petrophysics and geological information to determine the wellbore seismic program. Identify the applicability of a wellbore seismic program for the exploration objective and acquisition configurations for different wellbore seismic techniques. Describe the acquisition and QC of the check shot survey / VSP. Describe the generation and QC of a synthetic seismogram from well logs and check shot data.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a603

Content:

- Synthetic Seismogram Project; Part 1: Data loading and QC
- Synthetic Seismogram Project; Part 2: Generation
- Zero Offset VSP Project; Part 1: Design and Acquisition
- Zero Offset VSP Project; Part 2: Processing
- Zero Offset VSP Project; Part 3: Time-Depth Correlation

EXPLORATION: Seismic Methods

2-D Seismic Interpretation

Description:

Evaluate seismic sections to interpret chronostratigraphic units and structural elements. Use the techniques of seismic interpretation to pick horizons and faults over an interval of interest. Tie existing well information to the seismic section using a synthetic seismogram. Combine the seismic interpretation and well data to create a seismic time map. Tie well information to the seismic section using the synthetic seismogram or check shot survey. Identify major reflections in the seismic data set. Enumerate criteria for picking faults based on the regional structural style. Describe conformable and unconformable seismic reflection geometry. Describe the steps to complete a seismic time map.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a604

Content:

- Seismic well tie
- Identify fault types and regional structure types
- Identify major reflections / Describe conformable and unconformable seismic reflection geometry
- Identify potential plays
- Further Acquisition and processing
- Mapping seismic events.

EXPLORATION: Seismic Methods

3-D Seismic Interpretation

Description:

Interpret a 3-D seismic survey using seismic sections and time slices to interpret horizons and faults. Display an understanding of the use of time slices, horizon slices and other 3-D techniques play in 3-D interpretation. Identify common horizon auto-picker parameters and their effects. Enumerate criteria for picking faults on time slices. Describe various 3-D survey display options. Describe creation and uses of horizon slices. List parameters for amplitude extraction of a 3-D horizon.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a606

Content:

- Structural Interpretation
- Stratigraphic Interpretation
- Special Techniques to support the structural and stratigraphic interpretation
- Amplitude Extractions and Anomalies
- Prospect Analysis

EXPLORATION: Seismic Methods

Seismic Attributes and Direct Hydrocarbon Indicators (DHI)

Description:

Evaluate seismic attribute sections to enhance conventional seismic interpretation. Identify the seismic effects of a 'bright spot' anomaly and their physical cause. Describe the Amplitude Vs. Offset (AVO) effect and the physics that govern the response. List the attributes of the Hilbert Transform and their mathematical formulation. List possible effects to seismic amplitude response on 'Bright Spot' prospect. Describe AVO response and its causes. Explain the limitations of AVO response. Review Hilbert transform attributes. Describe work flow for evaluating attribute effectiveness.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a608

Content:

- Actual reservoir level AVO Modeling
- Actual reservoir level AVO Analysis
- Discovering new prospective levels using AVO analysis
- Processing Sequence and Amplitude QC
- Amplitude Analysis (Stacked Domain)

EXPLORATION: Reservoir Description and Characterization

Petrophysical Evaluation

Description:

Determine rock and fluid properties using open hole logs, mud logs, cuttings and core data. Evaluate lithology, mineralogy, fluid distribution, temperature and pressure gradients including rock quality. Define key petrophysical properties and their significance. Describe the operating principles, capabilities, limitations and areas of application of commonly used open hole logging devices. Describe basic response and limitation of each log type. Validate log response using core and well cuttings.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a640

Content:

- Evaluation Program
- Quick Look Evaluation
- Gama 1 Quick Look Interpretation

EXPLORATION: Reservoir Description and Characterization

Interpretation of Well Logs

Description:

Use electromagnetic, radioactive, acoustic and other logs to infer stratigraphic and structural characteristics of subsurface formations. Determine basic properties of a potential reservoir. Describe common log responses for source, reservoir and seal units. Describe common log patterns and their facies equivalent. Apply basic log interpretation methods to determine porosity, permeability, fluid saturation and boundaries for reservoir description. Make a preliminary estimate of reserves using Well 1 and analog field parameters.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a641

Content:

- Gama 1 Conclusions and Recommendations
- Gama 2 Evaluation
- Gama 3 Evaluation
- Gama 4 Evaluation

EXPLORATION: Reservoir Description and Characterization

Reservoir Geology

Description:

Generate a geological reservoir model. Define reservoir in terms of continuity, lithology, facies distribution, structural geometry and style. Using the petrophysical parameters developed from well log analysis, estimate the original oil and gas volume in place. Establish geological reservoir model define, objectives and modeling tasks. Review reservoir architecture, reservoir properties and their distribution, and integrate for construction of a static geological model. Integrate seismic horizons and facies into the geological model. Estimate original hydrocarbons in place.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a642

Content:

- The Exploration Discovery Well (Gama 1)
- The Appraisal Well (Gama 2)
- The Follow Up Wells (Gama 3 & Gama 4)
- The Volumetric Calculation

EXPLORATION: Reservoir Description and Characterization

Reservoir Geophysics

Description:

Analyze and interpret seismic and geological information for the purpose of reservoir description. Convert seismic time horizons to depth, based on well and seismic velocities. Evaluate seismic facies and their depositional environment in order to produce analogs of their potential reservoirs. Analyze seismic interpretation to determine best methodology for depth conversion. Present Pros and Cons of different depthing approaches. Select depositional model analog that best fits the regional and seismic facies characteristics. Evaluate seismic facies with reservoir properties determined from wells, to gain insight to reservoir property distribution.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a643

Content:

- SI Units
- Polarity Conventions
- Check-shot Surveys
- Velocities
- Time-to-depth conversion
- Synthetic seismograms and well-to-seismic match
- Vertical Seismic Profile
- Construction & Interpretation of a Drift Curve

EXPLORATION: Reservoir Description and Characterization

Exploration Geostatistics

Description:

Use statistical methods to describe the characteristics of the hydrocarbon-bearing system. Validate the description by comparing data with reservoir analogs. Establish supporting trends for predicting properties in both drilled and non-drilled areas. Characterize dependence among multiple variables. Describe risk and uncertainty using probabilistic distributions. Apply preliminary statistical analysis methods to geological data. Apply conventional techniques to validate reservoir data and trend maps. Demonstrate an understanding of risk and uncertainty in probabilistic distributions. Build single model variograms for simple reservoir properties. Apply basic Krigging techniques to generate representative reservoir parameter maps.

Duration:
8 hours

Course Code:
IHRDC_IPIMS_a644

Content:

- Preliminary Statistical Analysis
- Validate Reservoir Data
- Property Modelling
- Facies Modelling
- The Static Volume Model
- The Dynamic Model

EXPLORATION: Wellsite Geological Operations

Geological Operations and Logistics

Description:

Determine the necessary resources for carrying out exploratory projects. Build a plan to address permitting, environmental and safety considerations, location construction, contracts, evaluation and specialized services. Understand the importance of the budgetary cycle and how it effects operations. Determine resources, steps and timeline for exploratory well. Identify and address issues related to contracting for exploratory services: such as scope of work, technical evaluation, and input for commercial evaluation. Describe data collection program for exploratory well. Collect and evaluate requests for exploratory well data and evaluate impact on budget. Describe data collection program for delineation well.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a680

Content:

- Data Acquisition; Commercial Evaluation
- Database Creation & Analysis
- Well Proposal
- Well Site Operations, Pre-spud Operational and Pre-spud Geological Requirements
- Tendering and Contracting

EXPLORATION: Wellsite Geological Operations

Data Logging and Geological Information

Description:

Design programs for collecting subsurface rock and fluid samples. Design mud-logging and cuttings program. Evaluate and select coring program. Specify requirements for measuring formation pressures and temperatures. Determine the necessary studies to be carried out using these data. Specify mud logging requirements including: collection intervals, sampling preparation, hydrocarbon indicators and lithology reporting. Design a well-cutting program including analysis; identify what uses these samples are used for. Describe order and inter-relationship of different well evaluation techniques. Design a coring program and specify procedures for sample collection, handling and analysis. Define fluid sampling requirements. Specify types of equipment to be used. Identify other data collection services that maybe needed for the successful evaluation.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a682

Content:

- Conventional (Routine) core Analysis and Special Core Analysis
- Logging While Drilling (LWD); Reporting on Well Operations
- Impact on Reservoir Geological Model
- Future Data Acquisition and Well Program
- Proposed Evaluation Appraisal Well 1 and 2
- Monitoring the well; Drillers Log and Mud Log
- Cuttings Sampling and Description; Litho-Stratigraphic Column
- Daily Drilling and Daily Geological Reports
- Wire-Line Logging; Sidewall Coring and Full Coring

EXPLORATION: Wellsite Geological Operations

Exploratory and Delineation Drilling

Description:

Upon completion of this module the learner will know how to monitor drilling programs for exploratory and delineation wells. Discuss the drilling program and understand the required equipment and procedures for each stage of well operations. Evaluate logic for wildcat location and subsequent delineation wells. Generate a proposal and Statement of Requirements for an exploratory or delineation well, providing input for the well design, drilling program and evaluation. Describe the relationship between formation evaluation requirements and the various aspects of well design and construction. Monitor and report on drilling operations to ensure clear communications. Discuss trade offs between drilling 'High' or 'Off" structure for initial wildcat. Evaluate location of delineation well, Well 2, based on results of a wildcat discovery and economic threshold.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a681

Content:

- Exploration and Appraisal Wells
- Well Design
- Mud Program
- Drilling Problems
- Casing and Cementing
- Well Completion
- Well Testing
- Evaluation of the Exploration and Appraisal Wells
- Development and Production Well Program
- Field Development Plan
- The Role of the Operations Geologist

EXPLORATION: Exploration Project Management

Exploration Process

Description:

Learn the technical and management steps that are followed to move an exploration opportunity from play to a prospect by applying a series of progressively expensive data collection steps beginning with aerial or satellite imaging, then gravity and magnetic surveys, seismic surveys, exploration and appraisal well drilling, reservoir characterization, resources estimation and economic analysis. Upon completion of this module, the learner will be able to: learn the progressively more expansive data collection and analysis steps that are applied to an exploration opportunity from the negotiation of a host country agreement to the request for funds to move to Field Development Planning, learn how the exploration process involves making decisions to acquire data under conditions of uncertainty (value of information), learn how exploration and appraisal wells are located to delineate a prospect, learn how resources are estimated using the SPE system under conditions of uncertainty, generate prospect economics based on estimated reserves and project economic indicator, and learn how to assess geological risk.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a725

Content:

- From Play to Prospect
- Exploration Data
- Drilling the Exploration Well
- Drilling the Appraisal Well
- Resource Estimation

EXPLORATION: Exploration Project Management

Project Economics, Risk, and Uncertainty Analysis

Description:

Perform economic analysis of petroleum projects under conditions of uncertainty. Develop simple examples of project metrics using spreadsheet monte carlo simulations for stochastic analysis. Build financial models to show project cash flow streams for both capital investment and income cash flow and calculate key metrics such as profit/investment ratio, profit, payout period, net present value, internal rate of return and expected monetary value. Where there are uncertainties in the variables, use standard software to prepare sensitivity and stochastic analysis to show the potential variations in the metrics because of these uncertainties. The objectives of this course are to introduce the learner to: analyze the economics of a prospect under conditions of uncertainty, build deterministic and stochastic models, build E&P financial models to demonstrate project cash flow, calculate project economic metrics including profit/investment ratios, profit, payout period, net present value, internal rate of return and expected monetary value, and prepare sensitivity and stochastic analysis to measure potential variations in project metrics.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a724

Content:

- Investment Cash Flow Analysis
- Net Income and Income Cash Flow Analysis; Net Cash Flow Analysis
- Calculating NPV, IRR and Capital Efficiency
- Measuring Uncertainty Using the Deterministic Estimates; the Tornado Diagram; the Monte Carlo Simulation
- Project Metrics When Using Debt to Fund One-Half of the Capital Costs
- Analyzing Uncertainty When a Project is Debt Funded
- Your Personal Opinion on Recommending that the Oceana Exploration Wells be Drilled

EXPLORATION: Exploration Project Management

Value of Information

Description:

The learner will analyze the economic "value of information" that can be achieved during the exploration process by applying various technologies at progressively higher costs to reduce uncertainty, thereby providing better estimates during the decision process. The objectives of this course are to: measure the value of data vs. the cost to acquire the data, determine multiple data acquisition scenarios that can accomplish the goals and measure their impact on the prospects economics, and understand the cost-benefit decision process and exploration uncertainty in making both technical and business decisions.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a723

Content:

- Value of Perfect Information
- Value of Imperfect Information
- Analyzing Decision Tree

EXPLORATION: Exploration Project Management

Exploration Business Management

Description:

After completing this course, the learner will have an understanding of the critical elements and methodologies that exploration and senior management need to apply before approving the drilling of exploration wells. The Learner will be able to: perform a critical review of a prospect, understand the role of economic thresholds in decision making, identify the key components of the decision process to drill an exploratory well, and identify how to align company strategy with exploration efforts.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a722

Content:

- Critical Review of an Exploration Prospect (case study A).
- Critical Review of an Exploration Prospect (case study B).
- Prioritizing Projects during Capital Rationing.
- Project Risk and Uncertainty in Investment Decisions.
- Components; Stages of Investment Decisions.
- Aligning Exploration Efforts with Company Strategy.

EXPLORATION: Exploration Project Management

Exploration Project Management

Description:

In this course you will be introduced to the project management stage-gate process, with attention to Stage One, the Exploration Stage. Specific focus is placed on the host country licensing agreement and its commercial terms, the value of information as it applies to the exploration process; including the manner in which an opportunity progresses from play to prospect, the drilling of exploratory wells and the formation evaluation decisions. The estimation of resources using the SPE resources management system, and the project economic analysis using both deterministic and stochastic analysis will be covered. The learner will be able to: describe the Exploration Project Management methodology and its role in the exploration process, understand the Exploration Process from both a technical and business management perspective, apply the SPE Resources Management System to exploration opportunities, understand the role of risk and uncertainty and the costs associated with risk reduction and its impact on profitability, know how to develop business metrics for an exploration prospect using project economics under conditions of uncertainty, and identify how to review the business and technical criteria necessary to move an opportunity from play to prospect through disciplined process that leads to a commitment to move to Stage Two: Planning Field Development.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a720

Content:

- Negotiate Exploration Rights
- Opportunity Fundamentals
- Conduct Seismic Surveys to Identify Prospects
- Drill Exploration Well Test Prospect
- Drill Appraisal Wells to Delineate Reservoir
- Complete Economic Analysis by Estimating Oil-in-Place and Potential Production
- Obtain Stage two Approval

EXPLORATION: Corporate Exploration Planning and Management

Strategic Scenario Planning and Business Analysis

Description:

The learners will learn how to apply strategic scenario planning and business analysis to select among options for business expansion into new strategic opportunity areas. The learner will be able to: understand the principles of Strategic Planning and its role in the aspirations and economic growth of your enterprise, know how to develop corporate strategies using scenario planning to improve profitability, respond to new opportunities, and achieve sustainable competitive advantage, learn the key elements that lead to corporate advantage and that create value for your enterprise, and know how to use the balance scorecard to implement your decisions.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a761

Content:

- Prior Year Budget
- Production, Spot Market Purchase, Biomass, and Join Venture Options
- Sensitivity Analysis

EXPLORATION: Corporate Exploration Planning and Management

Exploration Project Best Practices and Procedures

Description:

The learner will learn how best practices and procedures, including workflow management, are applied to Petroleum exploration and how they lead to streamlined, predictable and efficient use of the companies resources and improved business performance. The learner will be able to: learn the essentials of the five-stage life cycle of a petroleum project that are an integral part of the corporate planning and exploration management process, learn the standard documents and procedures that should be applied to petroleum exploration, learn the key components of Stage One: Assessment of Exploration Opportunities, and learn a typical exploration workflow and best practices used in petroleum exploration.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a762

Content:

- Stage One: Identification and Assessment of Opportunities
- Stage Two: Analyze Alternative Development Options
- Stage Three: Optimizing the Preferred Development Plan
- Stage Four: Execution of the Field Development Plan
- Stage Five: Management of Production Operations

EXPLORATION: Corporate Exploration Planning and Management

Corporate Portfolio Management

Description:

Petroleum exploration opportunities, like investments in the stock market, face a wide range of risks with substantial impact on ultimate financial performance; however, with careful planning, analysis and selection, these projects can be grouped into portfolios, with relatively predictable outcomes. In this module you will learn how energy opportunity diversification using portfolio management processes leads to a predictable commercial outcome. Global exploration opportunities are studied in the context of reserve and income replacement. The learner will be able to: learn key business fundamentals of an enterprise including existing businesses and their historical performance, analyze and characterize the portfolio of existing and potential businesses and rank them in light of business performance fundamentals and the strategic objectives of the enterprise, and learn how to apply risk to your decision process and its effect on the portfolio.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a763

Content:

- Land Investment Projects
- Sea, Biomass, and Landfill Projects
- Portfolio Component Analysis
- Timing Considerations

EXPLORATION: Corporate Exploration Planning and Management

Portfolio Performance Optimization

Description:

Using modern portfolio management theory and practice the learner will use your methanol company's current enterprise wide operating assets and new exploration opportunities to optimize the performance of it's integrated portfolio. In the process you will learn to build and manage the portfolio as you review the current assets and new opportunities using portfolio management techniques and within the existing investment environment. The learner will be able to: learn to apply Portfolio Management to exploration opportunities, learn what an efficient frontier is and its role in portfolio performance optimization, learn the various ways you can go about rebalancing your enterprise portfolio, know how to apply passive and active portfolio rebalancing.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a764

Content:

- Baseline Analysis
- Passive and Active Rebalancing
- Diversification and Target Assessment

EXPLORATION: Corporate Exploration Planning and Management

Environmental Impact Evaluation

Description:

The learner will be introduced to the systematic process that is used by international companies to identify, mitigate, and manage environmental impacts of proposed upstream oil and gas projects using World Bank Standards and the Equator Principles, as well as: learn the scope and application of environmental regulations necessary to receive environmental permits to proceed with exploration projects, learn the essence of environmental and social impact statements (EIS), their scope and implementation for exploration projects using the World Bank process as a universal model., learn how to apply the Equator Principles for international projects that require bank financing, learn how to manage the EIS process from initiation to final audit for an E&P project, and review summaries of EIS filings for actual exploration projects.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a760

Content:

- Environmental Regulations
- Environmental and Social Impact Statements (EIS)
- Equator Principles
- Environmental Safeguard Process for an E&P Project
- Review summaries of EIS filings

RESERVOIR MANAGEMENT: Reservoir Engineering Fundamentals

Reservoir Rock and Fluid Properties

Description:

Define the properties of the reservoir rock/fluid system. Upon completing this Learning Module assignment, the participant should be able to define the following reservoir properties and understand their importance in the overall reservoir development scheme: rock properties (porosity, permeability, fluid saturation, compressibility, anisotropy), fluid properties (phase behavior, PVT relationships, density, viscosity, compressibility, formation volume factor, gas-oil ratio), rock/fluid interactions (wettability, interfacial tension, capillary pressure, relative permeability), read and understand wellsite descriptions of recovered core material, evaluate the core handling and preservation techniques employed, and select sample intervals for laboratory analysis, generate a procedure for preparing and analyzing selected core samples, specifying the tests to be run and the information to be obtained, describe the laboratory techniques and perform the calculations used for determining rock properties, design procedures for obtaining representative surface and subsurface formation fluid samples, describe procedures for generating PVT analyses of reservoir fluid samples, and interpret the resulting reports, and use published correlations to estimate reservoir fluid properties.

Duration:
8 hours

Course Code:
IHRDC_IPIMS_a1

Content:

- Reservoir Data
- Fluid Sampling (Separator and Subsurface)
- PVT Analysis
- PVT Correlations
- Coring Operations
- Core Sampling and Sample Preparation
- Core Analysis
- Rock Property Correlations

RESERVOIR MANAGEMENT: Reservoir Engineering Fundamentals

Rock Mechanics Fundamentals

Description:

Upon completing this Learning Module assignment, the participant should be able to apply rock mechanics fundamentals to describe well, reservoir and production behavior and define the following rock mechanical properties under various conditions of confining pressure, describe how these properties influence wellbore stability, directional drilling considerations, well completion design and other aspects of reservoir development, and know how they are measured in the laboratory: Brinell hardness, tensile strength, normal/shear stress relationships and failure mechanisms (Mohr circles), Young's modulus, Poisson's ratio, compressive strength, and shear strength.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a2

Content:

- Calculate Overburden and Pore Pressure
- Interpretation
- Generate Mohr Failure Envelope

RESERVOIR MANAGEMENT: Reservoir Engineering Fundamentals

Stability and Rock Deformation Models

Description:
Upon completing this assignment, the participant should be able to identify the presence and orientation of fracture systems in the reservoir and generate a stability and rock deformation model.

Duration:
8 hours

Course Code:
IHRDC_IPIMS_a3

Content:

- Review of Core Data
- Fracture Orientation
- Review of Other Geologic Data

RESERVOIR MANAGEMENT: Reservoir Engineering Fundamentals

Reservoir Drive Mechanisms

Description:

Upon completing this assignment, the participant should be able to identify primary reservoir drive mechanisms (solution gas drive, water drive, gas cap drive) by observing production and pressure trends, estimate original hydrocarbons in place, using both volumetric and material balance methods, develop a range of estimates for technical recovery factors and reserves, and identify and interpret production mechanisms to predict the behavior of oil, gas and gas condensate reservoirs.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a4

Content:

- Volumetric Estimate of Hydrocarbon in Place
- Material Balance Estimate of Hydrocarbon in Place

RESERVOIR MANAGEMENT: Reservoir Engineering Fundamentals

Multidisciplinary Reservoir Management

Description:

The participant will be able to contribute to the efforts of a multidisciplinary reservoir management team, based on a general knowledge of related disciplines. Upon completing this Learning Module assignment, the participant should also be able to demonstrate a basic knowledge of disciplines outside of reservoir engineering (i.e., Geology, Sedimentology, Petrophysics, Geophysics, etc.), establish a working relationship with specialists from these disciplines, and understand the role of different disciplines in the overall process of reservoir characterization and exploitation

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a6

Content:

- Review Reservoir Data
- Review Role of Different E&P Disciplines

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Interdisciplinary Data Acquisition

Description:

Gather, view, classify and validate the multidisciplinary information required for conducting integrated reservoir studies. Upon completing this Learning Module assignment, the participant should be able to access PDVSA engineering and geoscience databases and identify information that is relevant to the field under study as well as classify information according to discipline and what reservoir parameters it helps to define.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a121

Content:

- Objectives
- Reservoir Data Sources and Applications

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Wireline Well Logging

Description:

Learn to select and apply the appropriate well logging tools for a particular set of well conditions and reservoir study parameters. Upon completing this Learning Module assignment, the participant should be able to select the appropriate logging tool(s) for evaluating a given reservoir parameter, taking into account operating conditions and limitations, and specify procedures, surface equipment, and auxiliary tools to be employed on a logging job.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a122

Content:

- Logging the Surface Hole Interval
- Logging the Production Hole Interval

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Well Log Quality Control

Description:

Validate the quality of information supplied by the logging service company to ensure that the data can be used in generating a petrophysical reservoir model. Upon completing this Learning Module assignment, the participant should be able to monitor the quality control of logging procedures, including calibration, correction and choice of scales.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a123

Content:

- Pre-survey
- Initial Survey

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Well Log Interpretation

Description:
Determine reservoir rock properties using well log analysis. Upon completing this course, the participant should be able to use log analysis to identify reservoir rock properties (fluid saturation, porosity, fluid contacts, permeabilities, bulk shale content, net oil sand, fractures)

Duration:
8 hours

Course Code:
IHRDC_IPIMS_a124

Content:

- Basic Log Interpretation

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Subsurface Mapping

Description:

Develop geological, petrophysical and sedimentological maps for use in generating a reservoir model. Upon completing this course, the participant should be able to generate geologic cross sections from well logs and draw subsurface contours and construct geologic and geophysical maps.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a125

Content:

- Structure Contouring: Initial Review
- Structure Contouring: Updating and Revision
- Other Types of Contour Maps

RESERVOIR MANAGEMENT: Well Logging and Subsurface Mapping

Reserves Definitions, Reporting, and Mapping

Description:

Upon completing this Learning Module assignment, the participant should be able to access the applications used to generate MEM maps in official format and generate a map using the applications. the learner will also be able to elaborate and update from the maps generated during the modeling of the reservoir, the maps required by the Ministry of Energy and Mines in official format, for the administration and control of the reserves.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a126

Content:

- Reporting Requirements and Reserves Definitions
- Mapping Requirements and Conventions

RESERVOIR MANAGEMENT: Reservoir Characterization and Modeling

Compaction and Subsidence

Description:

Upon completing this Learning Module assignment, the participant should be able to measure compaction, subsidence parameters, and determine the significance of these parameters with redetermining drive mechanisms, etc. The learner will also be able to analyze, calculate and validate compaction, subsidence and settling parameters to predict their influence on the behavior of the project and their impact on recovery, using the results of this analysis to optimize exploitation projects.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a127

Content:

- Compaction and Subsidence: Basic Concepts
- Subsidence Prediction

RESERVOIR MANAGEMENT: Reservoir Characterization and Modeling

Pressure/Production Data Analysis

Description:

Analyze and interpret pressure and production data for incorporation into the reservoir model. Upon completion of this module, the participant should be able to: review and acquire well test information, validate pressure test information, prepare well test data for analysis, diagnose and interpret the pressure test, design and interpret production records, and analyze production behavior.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a128

Content:

- Preparation of Well Test Data
- Well Test Analysis--Part 1
- Well Test Analysis--Part 2

RESERVOIR MANAGEMENT: Reservoir Characterization and Modeling

Flow Unit Determination

Description:

Upon completing this Learning Module assignment, the participant should be able to establish the areal and vertical distribution of zones with similar behavior in agreement with the reservoir model and identify and delineate the rock volumes with sedimentological, petrophysical and reservoir properties that enable hydraulic communication.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a129

Content:

- Flow Unit Determination

RESERVOIR MANAGEMENT: Reservoir Characterization and Modeling

Reservoir Simulation

Description:

Apply analytical and numerical simulation techniques to the development, testing and refining of a reservoir model, and the generation of an optimal reservoir exploitation plan. Upon completion of this module, the participant should be able to:define reservoir simulation objectives, define simulator geometry and dimensions, and assign flow equations to the proposed model, define simulator grid and boundary conditions, compile reservoir model input parameters, develop finite-difference approximations to solve the flow equations, plan numerical simulation computer runs and interpret the results, and use simulation results to determine the optimum exploitation scheme.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a130

Content:

- Reservoir Models and Data Gathering
- Flow Equations and Boundary Conditions
- Solution to the Flow Equations (Simulation Process)
- Interpretation of Simulation Results

RESERVOIR MANAGEMENT: Reservoir Surveillance

Data Acquisition

Description:

Acquire and analyze the necessary data for optimizing reservoir surveillance. Upon completion of this module, the participant should be able to acquire and analyze pressure data, PVT reports, production records, injection records, production tests, fluid sampling, injectivity tests, and other information for the purpose of monitoring reservoir behavior.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a161

Content:

- Reservoir Description
- Data Collection and Input
- Future Planning and Day-to-Day Surveillance

RESERVOIR MANAGEMENT: Reservoir Surveillance

Geologic/Seismic Integration

Description:

Integrate multidimensional seismic information and geological data to optimize the processes of reservoir monitoring and exploitation. Upon completion of this module, the participant should be able to establish a basis for integrating geophysical and geological data and incorporating them into the reservoir surveillance program.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a162

Content:

- Geological Parameters
- Integration of Geological and Geophysical Data
- Reservoir Surveillance Applications
- Cross-well Seismic Surveying

RESERVOIR MANAGEMENT: Reservoir Surveillance

Geological Model Updating

Description:

Upon completion of this module, the participant should be able to apply information from newly acquired well logs, core samples and other data sources to refine the geological model of the reservoir, including its structure, stratigraphy, dimensions and boundaries.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a163

Content:

- Review of geological data
- Geological interpretation

RESERVOIR MANAGEMENT: Reservoir Surveillance

Petrophysical Model Updating

Description:
Upon completion of this module, the participant should be able to use well logs, cores, correlations and other tools to establish the distribution of petrophysical properties in the reservoir.

Duration:
8 hours

Course Code:
IHRDC_IPIMS_a164

Content:

- Core Data Analysis
- Well Log Interpretation

RESERVOIR MANAGEMENT: Reservoir Surveillance

Reservoir Model Updating

Description:

Upon completion of this module, the participant should be able to incorporate new production data (selective & differential) into the reservoir model, along with new information from well/core analyses and refine the reservoir model based on differences between predicted and actual pressure and production data.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a165

Content:

- Model Update
- Interpretation of Simulation Results

RESERVOIR MANAGEMENT: Reservoir Development Strategies

Economic Evaluation

Description:

Use economic evaluation methods to select the most profitable project and/or exploitation strategy, and formulate a project budget. Upon completion of this module, the participant should be able to apply economic evaluation techniques that are necessary for analyzing proposed long-range exploitation strategies and/or projects in the areas of reservoir, drilling and production.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a201

Content:

- Generation of Development Budget; Elements of Investment and Income Cash Flow
- Economic Evaluation of Development Alternatives
- Sensitivity Analysis

RESERVOIR MANAGEMENT: Reservoir Development Strategies

Permitting for Well Operations

Description:

Prepare the required permission requests for drilling, workover/recompletion, stimulation, abandonment and well servicing operations to satisfy the established legal requirements of governmental regulatory organizations. Upon completion of this module, the participant should be able to follow proper procedures for obtaining permission to conduct drilling, workover/recompletion, stimulations, abandonment proposals and well servicing operations, in accordance the established legal requirements of the MEM, MARNR and other official organizations.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a202

Content:

- Permission to Drill Well
- Well Workovers and Abandonments
- Project Management

RESERVOIR MANAGEMENT: Reservoir Development Strategies

Health, Safety, and Environment

Description:

Apply the laws, regulations and norms relating to personal, environmental and industrial safety as they apply to oil and gas operations. Upon completion of this module, the participant should be able to: apply the laws, regulations and norms in matters of personal, industrial and environmental safety, with the objective of protecting the integrity of persons, installations, equipment and the environment and identify instances in which safe practices are not being followed, and take steps to correct the situation.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a203

Content:

- Site Visit: Drilling Rig
- Incident Reviews
- Fire Prevention and Protection

RESERVOIR MANAGEMENT: Reservoir Development Strategies

Reservoir Management and Control

Description:

Optimize reservoir management and control decisions using surveillance techniques, information systems, technical indicators and financial guidelines. Upon completion of this module, the participant should be able to do the following: manage available resources (e.g., reserves, assets, personnel, budget) in order to maximize hydrocarbon reserves and minimize recovery cost and make appropriate reservoir management and control decisions with the aid of surveillance techniques, information systems and technology applications to generate pressure and production histories, maps and other key reservoir data.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a204

Content:

- Reservoir Performance Review
- Optimization of Well Production

RESERVOIR MANAGEMENT: Reservoir Development Strategies

Improved Recovery

Description:

Evaluate the improved recovery potential of the reservoir. Upon completion of this module, the participant should be able to apply basic screening criteria and determine a reservoir's suitability for various improved recovery processes, including waterflooding and enhanced oil recovery, observe waterflood performance and perform basic recovery calculations, based on a frontal advance model and analysis of fractional flow curves, and determine the displacement efficiency of a pilot waterflood.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a205

Content:

- Improved Recovery Options
- Water Displacement Calculations
- Fractional Flow Analysis
- Estimation of Sweep Efficiency
- Displacement Process in Stratified Reservoirs

RESERVOIR MANAGEMENT: Reservoir Management Practices

Implementation of Reservoir Development Strategies

Description:

Develop a strategic scenario and budget for implementing a reservoir development scheme and producing actual reserves. Upon completion of this module, the participant should be able to use reservoir studies to develop a resource base (drilling plans, future improved recovery, information acquisition, application of new technologies, facilities and infrastructure)and evaluate reservoir exploitation schemes through the use of corporate management indicators.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a206

Content:

- Validation of Pilot Project Results
- Project Design and Implementation

RESERVOIR MANAGEMENT: Reservoir Management Practices

Reservoir Surveillance and Control

Description:

Understand and apply reservoir surveillance and control techniques to confirm the materialization of the proposed strategies in the reservoir exploitation scheme. Upon completion of this module, the participant should be able to compare actual reservoir behavior to various performance prediction tools and account for differences, evaluate the effectiveness of the exploitation strategy, and explain reasons why actual reservoir performance deviated from initial predictions.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a208

Content:

- Cumulative Recovery and Recovery Efficiency Calculations
- Injection Well Performance

RESERVOIR MANAGEMENT: Reservoir Management Practices

Contracts

Description:

Analyze scenarios, make suitable contract models and study special projects in areas of the exploitation macro process, assuring business profitability and respecting the prevailing laws and norms of contracts. Upon completion of this module, the participant should be able to analyze field projects, generate contract models and evaluate contracts in terms of project profitability.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a209

Content:

- Drilling Term Summary
- Master Service Contract

DRILLING AND WELL COMPLETION: Drilling and Well Completion Practices

Initial Well Planning

Description:

Define basic drilling and well completion requirements based on reservoir management objectives. Identify critical logistical issues and HSE considerations. Upon completion of this module, the participant should be able to: review an initial well proposal and identify key drilling and completion objectives, gather and evaluate offset data and other information pertinent to the well objectives, document and evaluate indicators of potential drilling hazards and/or HSE risks, identify appropriate methods for predicting pore pressures, fracture pressures, and subsurface temperatures, and plot predicted pressures and temperatures versus depth, determine formation fluids to be encountered and potential contaminants, outline critical issues relating to surface location, including those related to logistics, safety and environmental protection and generate a budget-level estimate of dry-hole and total well costs.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a241

Content:

- Well Objectives
- Basic Well Planning Considerations
- Potential Hazards
- Regulatory Compliance
- Subsurface Pressure and Temperature Prediction
- Budget Cost Estimate

DRILLING AND WELL COMPLETION: Drilling and Well Completion Practices

Well Design

Description:

Define basic well design parameters, including well profile, casing points and casing/hole diameters. Design casing strings and outline cementing requirements. Select surface equipment components. Generate preliminary cost estimates for inclusion in AFE. Upon completion of this module, the participant should be able to: select a surface location for a new well and establish an optimal target radius, pick casing points and specify casing and hole diameters for each drilled section, establish a well trajectory in keeping with overall drilling objectives, select casing weights, grades and connections based on consideration of maximum load conditions, determine general requirements for primary cementing operations, and specify wellhead equipment components and their working pressure ratings.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a242

Content:

- Initial Design Parameters
- Well Trajectory
- Surface Casing Design
- Intermediate Casing Design
- Production Hole Interval

DRILLING AND WELL COMPLETION: Drilling and Well Completion Practices

Drilling Program Planning and Implementation

Description:

Design mud program for each hole section. Establish well control precautions and procedures. Design drill string and bottomhole assembly. Plan bit and hydraulics programs. Evaluate rig specifications and capabilities. Upon completion of this module, the participant should be able to: outline mud system specifications for individual hole sections based on well conditions and drilling objectives, establish basic well control requirements, specify circulating system requirements and evaluate hydraulics practices based on offset well performance, review offset bit performance as a basis for developing bit selection criteria for a new well, provide general recommendations for the drill string configuration and design of the bottomhole assembly, and review rig specifications and capabilities in the context of drilling program requirements.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a243

Content:

- Mud Program Design and Well Control Considerations
- Hydraulics; Bit Selection and Drillstring Design; and Rig Specifications

DRILLING AND WELL COMPLETION: Drilling and Well Completion Practices

Drilling Operations

Description:

Monitor drilling parameters and well progress. Take steps to optimize bit runs, mud system performance and directional control. Ensure HSE compliance. Anticipate drilling problems and work to minimize their impact. Upon completion of this module, the participant should be able to: optimize drilling performance through careful monitoring and analysis of well parameters, select bottomhole assembly configurations for various hole intervals and operating conditions, oversee routine cementing operations in shallow hole intervals, diagnose a stuck pipe incident and outline fishing procedures, and monitor drilling parameters for indications of abnormal pore pressure and take the appropriate initial actions in response to a potential kick situation.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a244

Content:

- Surface Hole Interval
- Intermediate Hole Interval
- Production Hole Interval

DRILLING AND WELL COMPLETION: Drilling and Well Completion Practices

Well Completion Operations

Description:

Prepare well for formation evaluation. Ensure that logging and testing operations proceed smoothly. Run and cement production casing. Evaluate primary cement job and need for remedial cementing operations. Prepare well for final completion. Upon completion of this module, the participant should be able to: prepare the well for open-hole logging operations and take steps to ensure that such operations proceed smoothly, alert the wellsite geologist and service company logging engineer of hole conditions that may require modifications or special precautions in the logging program, assist in planning and carrying out a drill stem test, determine safe operating parameters for running a production casing string, plan and carry out a simple single-stage primary cementing operation, use temperature surveys to determine the top of cement in the casing/hole annulus, and outline the steps involved in preparing the well for final completion and releasing the drilling rig.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a245

Content:

- Well Evaluation
- Well Completion

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Well Planning

Description:

Identify, monitor and evaluate drilling, workover, stimulation and well servicing proposals and activities in the context of optimizing the overall reservoir exploitation scheme. Upon completion of this module, the participant should be able to contribute to the well planning process by understanding the reservoir engineering aspects of the proposed work and having a knowledge of drilling, workover and well servicing fundamentals, as well as work with the geologist and the drilling engineer to select well locations, target depths and casing points.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a41

Content:

- General Well Planning Objectives
- New Well Proposal: Correlations and Target Depth
- New Well Proposal: Well Profile
- Subsurface Pressures and Mud weight Selection
- Drilling and Completion

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Well Completion Design

Description:

Select the appropriate tubing and accessories for completing wells in keeping with the production method required for the reservoir, and to facilitate future workover, servicing and stimulation work.Upon completion of this module, the participant should be able to select the proper sizes and grades of tubulars to maintain the integrity of the wellbore and handle anticipated production, as well as select the downhole casing and tubing accessories needed to optimize production and future well work.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a42

Content:

- Select Tubing; Casing and Bit Sizes
- Select Production Casing String
- Select Surface Casing String

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Drilling and Workover Fluids

Description:

Select the appropriate drilling/workover fluid for meeting well objectives and, minimizing formation damage with no impact on the environment. Upon completion of this module, the participant should be able to evaluate the features, benefits and limitations of various mud systems and additives, and select the one most appropriate for a given well, as well as specify controls on fluid properties in order to optimize drilling and workover operations

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a43

Content:

- General Mud System Considerations
- Drilling the Surface Hole Interval
- Drilling Below the Surface Casing
- Completion Fluid Design

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Drilling and Workover Hydraulics

Description:

Maximize penetration rates, minimize formation damage and ensure hole stability through the proper application of drilling hydraulics principles. Upon completion of this module, the participant should be able to determine the pressure losses that occur in the rig circulating system, use basic calculation methods to determine optimal bit nozzle size, annular velocity and other rig hydraulics parameters, and diagnose drilling problems resulting from poor hydraulics practices

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a44

Content:

- Wellbore Pressure
- Hydraulics Optimization

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Cementing

Description:

Determine the most appropriate procedures, equipment, tools and cementing materials for assuring a high-quality cement job. Upon completion of this module, the participant should be able to: determine the volume, displacement and density requirements for cementing a casing string, select the cement additives appropriate to a given job, specify the casing accessories to be use on a primary cement job, outline the steps involved in cementing a string of casing, evaluate the results of a primary or squeeze cementing operation, and calculate the volumes and displacements required to set a cement plug.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a45

Content:

- Cement Volume Calculations and Material Requirements
- Primary Cement Job
- Remedial Cementing Operations

DRILLING AND WELL COMPLETION: Drilling, Workover and Well Servicing

Directional, Horizontal, and Multilateral Wells

Description:

Contribute to the planning and design of non-conventional well completions. Upon completion of this module, the participant should be able to identify reservoirs that are suitable candidates for horizontal or multilateral wells, apply knowledge of the reservoir to a selection of the well trajectory, and select the best general completion design for a horizontal or multilateral well in a given reservoir.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a46

Content:

- Directional Drilling and Well Planning
- Horizontal Well Planning
- Multilateral Wells

PRODUCTION ENGINEERING AND OPERATIONS: Production Fundamentals

Production Methods

Description:

Apply basic production engineering principles to optimizing the reservoir exploitation scheme. Upon completion of this module, the participant should be able to: select the optimal completion design and the proper surface and subsurface equipment for producing a flowing oil well efficiently and economically, optimize flowing well performance based on knowledge of inflow performance, vertical lift performance and surface choke performance, determine when artificial lift will be necessary in order to maintain oil production at desired levels, and select the most appropriate lift method for a given well, as well as specify design and equipment requirements for placing a well on artificial lift.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a81

Content:

- Completion Design and Production Equipment
- Inflow Performance Relationship (IPR)
- Surface Flowing Well Performance
- Vertical Lift Performance
- Flowing Well Performance
- Artificial Lift Screening

PRODUCTION ENGINEERING AND OPERATIONS: Production Fundamentals

Production Optimization

Description:

Upon completion of this module, the participant should be able to: analyze well behavior, using nodal analysis and interpreting historical production trends, diagnose equipment problems and/or detect production deviations, identify production problems relating to pressure decline, water, gas or sand production, low productivity, formation damage or equipment failure, recommend actions required for optimizing production, identify candidate wells for well servicing, stimulation and/or sand control and indicate the best method to use.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a82

Content:

- Productivity Index and Flow Efficiency
- Stimulation Planning
- Well Performance Optimization; Part 1
- Well Performance Optimization; Part 2

PRODUCTION ENGINEERING AND OPERATIONS: Production Fundamentals

Production Facilities

Description:

Determine surface facility requirements for handling the gas and liquid production volumes established for the reservoir. Upon completion of this module, the participant should be able to : determine fluid handling and transport requirements for surface facilities and equipment, identify the surface facility components needed to handle the field's production, specifying their capacities and pressure ratings, and generate a general surface facilities layout showing the path of the produced fluids from the wellhead to the transportation point (pipeline or loading rack).

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a83

Content:

- General Facility Layout
- Handling of Produced Well Fluids
- Separation of Produced Fluids
- Handling of Separated Fluids

PRODUCTION ENGINEERING AND OPERATIONS: Production Fundamentals

Well Testing

Description:

Upon completion of this module, the participant should be able to select candidate wells for testing and specify test objectives, design a pressure transient test and select equipment in keeping with the stated objectives, and monitor the test and interpret the results

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a84

Content:

- Well Test Objectives
- Well Test Design
- Qualitative Drill Stem Test Evaluation
- Basic Drill Stem Test Analysis

PRODUCTION ENGINEERING AND OPERATIONS: Production and Operating Practices

Flowing Well Performance and Production System Analysis

Description:

Establish Inflow Performance Relationship (IPR) and determine flowing well potential. Use systems analysis approach to predict and optimize production. Upon completion of this module, the participant should be able to: use production data to define a well's IPR and flow potential under current operating conditions, predict changes in well potential resulting from declining reservoir pressures, evaluate the effects of various operating parameters on flowing well performance, design a single-well production system based on analysis of individual system components, select the appropriate tubing and flowline diameters for optimizing well performance, and predict future production rates based on changing operating conditions.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a281

Content:

- Production Test Analysis; Part 1: IPR Determination
- Production Test; Part 2: System Analysis
- Production System Design

PRODUCTION ENGINEERING AND OPERATIONS: Production and Operating Practices

Artificial Lift Methods

Description:

Determine need for artificial lift. Evaluate and design system. Upon completion of this module, the participant should be able to: distinguish among the common methods of artificial lift and understand their advantages and limitations, select the most appropriate artificial lift method for a given set of well and economic conditions, perform basic surface and subsurface design calculations for gas lift and pump-assisted systems, and monitor artificial lift performance.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a282

Content:

- Producing Well Evaluation
- Beam Pumping System Design
- Gas Lift: Initial Considerations
- Gas Lift: System Design
- ESP Systems

PRODUCTION ENGINEERING AND OPERATIONS: Production and Operating Practices

Well Stimulation and Sand Control

Description:

Diagnose production problems related to formation damage and recommend appropriate solutions. Upon completion of this module, the participant should be able to: diagnose various types of formation damage and identify stimulation candidates, design a matrix acid stimulation treatment based on specific well conditions and reservoir characteristics, specify the materials, equipment and pumping schedule for a hydraulic fracturing procedure, and apply traditional and modern sand control methods to optimize well productivity.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a283

Content:

- Matrix Acid Stimulation
- Hydraulic Fracturing
- Sand Control

PRODUCTION ENGINEERING AND OPERATIONS: Production and Operating Practices

Workover Planning and Operations

Description:

Identify workover candidates and outline procedures for accomplishing well objectives. Upon completion of this course, the participant should be able to: evaluate well performance and identify workover or abandonment candidates, plan safe workovers using the tools and methods appropriate to individual wells, and apply procedures and standards in accordance with recognized safe practices and regulatory requirements.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a284

Content:

- Well Performance Review
- Remedial Cementing: Squeeze Procedures
- Perforating Operations
- Plugback Operations

PRODUCTION ENGINEERING AND OPERATIONS: Production and Operating Practices

Surface Production Operations

Description:

Generate production facilities requirements. Promote safe practices in production operations. Upon completion of this course, the participant should be able to: review surface flowing well conditions with the goal of optimizing production, describe the basic layout of an upstream producing facility and the functions of its major components, outline the general requirements for separating and treating produced oil as a basis for a detailed facility design, and plan and oversee routine field maintenance work, and maintain a safe operation through proper application of good work practices and the careful control of site activities.

Duration:

8 hours

Course Code:

IHRDC_IPIMS_a285

Content:

- Surface Operations and Maintenance

IHRDC

International Human Resources Development Corporation

Business Essentials

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AGILE

Introduction to Agile

Description:

The Introduction to Agile course explores the methodologies and practices of Agile development and explains the key concepts and principles that form the foundation of Agile project management. This self-paced course contains vocabulary games, flashcards, and interactive exercises to supplement and enhance your understanding of Agile concepts, as well as video segments from Agile experts to help you become a more proficient Agile practitioner. The information in this course is also included in our Agile Certified Practitioner Exam Prep course as that course's introductory modules; the Agile Certified Practitioner Exam Prep course continues with additional material to prepare students for the Project Management Institute®'s Agile Certified Practitioner Exam.

Duration:
4 hours

Course Code:
IHRDC_BEES_1034

Content:

- Define Agile development and differentiate it from traditional Waterfall practices
- Identify the similarities and differences among several Agile methodologies
- Describe the stages of the Agile development cycle and identify the factors that promote project success
- Understand the nuances of leading and working with Agile teams
- Apply best practices from organizations that have successfully incorporated Agile methodologies into their business activities

Agile Team Challenges

Description:

This course is designed to help Agile practitioners decipher and solve the problems that arise regularly in their work. The course consists of 20 short case studies that test the student's understanding of Agile practices and provide guidance for resolving common problems. The case studies are structured to simulate the conversations and interactions that happen regularly on Agile projects; seeing these disputes as narratives will help students learn to deconstruct issues and diagnose the underlying problems that need to be corrected, just as they would in their everyday work. As students decode these disputes and plan appropriate responses, they'll gain the experience they need to guide their teams and to put them back on track to deliver value to their customers.

Duration:
4 hours

Course Code:
IHRDC_BEES_674

Content:

- Identify the underlying issues that lead to common problems for Agile teams.
- Apply practical tips from experienced practitioners to resolve these problems.
- Sharpen and enhance your skills as you create an effective environment for your Agile team to work in.

AGILE

Integrating Agile and Waterfall Practices

Description:

This course is designed to help Agile proponents recognize and resolve many of the common integration issues that emerge when these two methodologies are combined. The course consists of 20 short case studies that simulate the communication and interchanges that can occur as Agile and Waterfall practitioners work to resolve differences in the ways that they see and execute tasks. As students evaluate these case studies, they'll learn to deconstruct and diagnose any underlying problems that need to be resolved, just as they would in everyday practice. While they work to decode and correct these issues, they'll begin to recognize the common pitfalls that can happen as project teams collaborate and interact, which will allow them to step in to solve potential problems before work is affected.

Duration:
3 hours

Course Code:
IHRDC_BEES_676

Content:

- Recognize the problems that Agile and Waterfall collaborators contend with on a regular basis.
- Apply practical tips from experienced practitioners to correct these problems.
- Polish and perfect your skills as you create an environment that enhances the alliance with your partners and collaborators.

Agile Certified Practitioner (PMI-ACP)® Exam Prep

Description:

"This course is designed to prepare learners for the Project Management Institute's Agile Certified Practitioner (PMI-ACP®) exam by exploring the methodologies, practices, tools, and techniques that Agilists need to master to become proficient practitioners. Students in this course will increase their knowledge of Agile concepts with interactive exercises, vocabulary games, flashcards, and video segments from experienced Agile practitioners. Each student's understanding of key Agile concepts and principles will be tested in several comprehensive module quizzes as well as in two 120-question practice exams designed to mirror the PMI®certification exam process. The course begins with the Agile Basics and Agile Applications modules from our Introduction to Agile course, as a foundation for students to build on as they prepare for their exams. These modules describe fundamental Agile ideas and concepts, and use Best Practices and Case Studies to explain how Agile methodologies are implemented in real-world situations. The course continues with a discussion and clarification of the key tools, techniques, and strategies that PMI has listed as important for Agile practitioners to understand to achieve their certification. Combining instructional material with real-world application of concepts helps to prepare learners for PMI® certification while simultaneously teaching them to successfully lead teams and complete Agile projects as they continue on their career paths."

Duration:
21 hours

Course Code:
IHRDC_BEES_1013

Content:

- Identify the similarities and differences among Agile methodologies.
- Describe the stages of the Agile development cycle and identify the factors that promote project success.
- Understand how to apply specific tools and techniques to successfully complete Agile projects
- Understand the interrelationships of tasks, activities, and practices in Agile projects.
- Understand the specific roles and responsibilities of team members and enhance interaction on Agile teams.
- Successfully complete the PMI-ACP® certification exam. Effectively lead and work with Agile teams.

AGILE

Agile Certified Practitioner (PMI-ACP)® Practice Exams & Exam Strategies

Description:

This course is designed to give learners an assessment of their readiness to take the Project Management Institute's PMI-ACP® Exam. The course contains two 120-question practice exams, which cover the information in the current PMI Agile reading list. The practice exams provide a comprehensive review of the material in this list as well as key strategies for preparing for the PMI Agile Certified Practitioner (PMI-ACP)® Exam.

Duration:

9 hours

Course Code:

IHRDC_BEES_1040

Content:

- Understand the structure and requirements of the PMI-ACP® Exam.
- Explain and apply the key concepts found in the Project Management Institute's Code of Ethics and Professional Conduct.
- Understand ways to improve your performance on the PMI-ACP® Exam.
- Begin your preparation for the PMI-ACP® Exam with confidence.

CAREER BUILDING

Personal Finance

Description:

Perhaps you have been in charge of your finances since you started working an after school job in high school, or maybe you are suddenly feeling overwhelmed with allocating the salary from your first job out of college. No matter what your financial situation is, it is important to understand how to handle your money. This course will familiarize you with the basics of budgeting, credit, saving, and investing.

Duration:
3 hours

Course Code:
IHRDC_BEES_1112

Content:

- Manage your personal finances confidently
- Explain what a budget is
- Understand why budgeting is important
- Set financial goals
- Create a budget
- Identify how to eliminate needless expenses
- Monitor and adjust your budget as necessary
- Have a grasp of what credit is and how to improve yours
- Utilize different methods for saving money and covering expenses
- Understand the investment options available to you

Ace Your Job Search!

Description:

This introductory-level course helps learners craft a resume that is targeted, elegant, and effective. It continues on to cover interviewing skills, focusing on the interview preparation and the five stages of the interview process. Finally, the course will help learners formulate winning answers to difficult interview questions.

Duration:
5 hours

Course Code:
IHRDC_BEES_346

Content:

- Recognize key career development questions to ask before beginning a job search
- Employ a written goal-setting process to establish career development and job search priorities
- Recognize the purpose of tailoring a resume and cover letter
- Develop a more effective resume
- Develop a more effective cover letter
- Identify the five stages of the interview process
- Conduct industry and company research efficiently using web-based resources
- Brainstorm potential interview questions and answers
- Understand what constitutes a good answer in the mind of a hiring manager
- Anticipate some of the most common interview questions
- Explain to a hiring manager how the past successes represented on your resume will translate to future success in your desired position
- Recognize whether a job aligns with your career objectives

CAREER BUILDING

The First 30 Days

Description:

So, you've just landed a new job. What happens now? The first 30 days provide you a unique opportunity to set yourself up for success in your new role. Lots of people, most significantly your boss, will form an impression of you from the beginning that will be hard to change later on. This course will help you prepare for your first thirty days on the job, laying the groundwork for a successful tenure in your new role and at the organization.

Duration:
3 hours

Course Code:
IHRDC_BEES_1047

Content:

- Explain the importance of starting off right in the first 30 days of a job
- Assess their readiness for work
- Outline how to prepare in advance for a new job
- Discuss workplace culture
- Explain what managers look for when employee start a job
- Discuss how to have a successful first day on the job
- Outline best practices for the first 30 days on the job
- Discuss how to build and maintain professional relationships
- Explore ways to overcome early challenges on the job
- Create a personal plan for the first 30 Days

Personal Branding

Description:

This course focuses on teaching you how to brand yourself professionally. What is brand? And how do you maintain your personal brand? The assignments in this course discuss the value of personal branding, the way to craft your personal brand statement, and finally, the best methods for communicating your personal brand to clients, employers, and other industry professionals.

Duration:
3 hours

Course Code:
IHRDC_BEES_1056

Content:

- Explain the importance of building a personal brand
- Describe how to develop a personal branding statement
- Explain the importance of having a unique selling proposition
- Discuss online assets, including website/blogs, social media, and videos
- Discuss offline assets, including dress/appearance, business cards, personal outreach, and mentors
- Develop a strategy for gaining experience in areas where your brand is weak
- Explain the importance of expertise, and discuss strategies for becoming known as an expert in your field
- Explain how to maintain and protect your brand

CAREER BUILDING

Networking for Success

Description:

Networking has become a significant part of the professional process, altering the way both entrepreneurs and organizations do business. This course will help you to improve your personal and professional networking skills by providing best practices and effective tips and techniques.

Duration:

3 hours

Course Code:

IHRDC_BEES_1075

Content:

- Explain the principles of networking
- Organize a networking plan that is right for them
- Outline short- and long-term networking goals
- Find and utilize the different available networking tools and resources
- Discuss how to approach, build, and maintain professional networks
- Identify the challenges of networking and how to overcome them
- Discuss the best and worst networking practices
- Find purpose in all available networking opportunities
- Create a personal and professional networking plan and organized system

Finding Purpose in your Career

Description:

Whether you're just starting out in the workforce or changing careers, it is important to understand how the job you perform contributes to your sense of fulfillment in life. This course prompts you to examine various job settings and functions, comparing each against your own preferences, values, and expectations, in order to determine the best job fit for you.

Duration:

3 hours

Course Code:

IHRDC_BEES_1076

Content:

- Identify your interests and priorities
- Connect your interests and priorities to related careers
- Distinguish between short-term and long-term goals
- Describe your goals and the steps you'll need to take to reach them
- Discuss various types of workplaces and their benefits and burdens
- Reflect on the importance of cultivating strong workplace relationships
- Identify various ways to work well with others
- Explain the importance of work-life balance

COMMUNICATIONS

Effective Presentations

Description:

The ability to deliver an effective presentation is critical in most job functions. This introductory-level course helps learners organize, structure, and create effective presentations that feature slides as a visual aid. Because many organizations use PowerPoint as a way of communicating information, this course offers advice and guidance on the most effective and persuasive uses of PowerPoint, including best practices on word count, graphics, and structure.

Duration:
5 hours

Course Code:
IHRDC_BEES_307

Content:

- Recognize what makes communication effective
- Understand the elements in the communications process
- Organize your communications and presentations
- Understand PowerPoint graphic rules of thumb
- Create an effective summary slide
- Describe and employ the four steps of purposeful communication in your presentations
- Understand the forecast, present, and echo structure for presentations
- Recognize key visual considerations for PowerPoint slides and presentations
- Understand how to organize and create PowerPoint presentations
- Revise PowerPoint slides to make them more effective
- Understand the success factors for face-to-face presentations

Effective Public Speaking

Description:

Confidence is a key to delivering an effective speech or presentation. This two-module course, Effective Public Speaking, helps you to develop the skills you'll need to become an outstanding and confident public speaker. It reviews the seven stages of public speaking through games, interactive exercises, and videos. The tools and techniques in this course can ensure that you'll excel when speaking in any situation, from the start of your speech or presentation to its successful end.

Duration:
4 hours

Course Code:
IHRDC_BEES_873

Content:

- Describe the seven stages of giving a speech or presentation
- Discuss the elements of establishing your purpose for speaking (Stage One)
- Recognize the need to consider your audience (Stage Two)
- Describe how to develop your central message (Stage Three)
- Explain how to employ evidence in supporting your main points (Stage Four)
- Discuss how to craft your speech (Stage Five)
- Explain how to rehearse for your speech (Stage Six)
- Describe techniques for delivering your speech (Stage Seven)
- Recognize best practices for employing slides in your presentation
- Describe key techniques for dealing with speech anxiety
- Discuss how to handle difficult questions
- Describe effective responses when things go wrong

COMMUNICATIONS

Communicating Collaboratively

Description:

Communicating effectively with team members and groups has become more important as organizations have relied on collaborative work to advance their goals. This course, Communicating Collaboratively, will help you improve your collaborative communication by providing best practices and effective tips and techniques.

Duration:
3 hours

Course Code:
IHRDC_BEES_895

Content:

- Identify the factors in interpersonal communication
- Modify communication strategies to be successful in small and large groups
- Devise a strategy for working effectively in remote settings, including in telework settings
- Explain the purpose of various types of meetings and explain the outcomes expected
- Attend a meeting and perform the role of an effective communicator in the meeting
- Prepare for, moderate, and follow up after a meeting to ensure effective use of organizational resources
- Document a meeting and distribute minutes or a meeting summary as appropriate

Effective Emails, Memos, and Letters

Description:

Communicating clearly and concisely in written formats like email, memos, and letters is very important in a workplace setting. This course, Effective Emails, Memos, and Letters, will help you improve your use of these common business communication vehicles by providing best practices and effective tips and techniques.

Duration:
3 hours

Course Code:
IHRDC_BEES_896

Content:

- Recognize when it's appropriate to use an email, a memo, or a letter
- Explain the parts of an email, a memo, and a letter, and format each so that the communication is effective
- Consider primary and secondary uses for the email, memo, or letter
- Explain how to facilitate both primary and secondary uses
- Create a sample email, memo, and letter employing best practices

COMMUNICATIONS

Effective Business Writing

Description:

The ability to write clearly and directly is highly prized in most organizations. Well-written emails and documents can help you earn respect among your peers. And poorly written emails and documents can detract from success at all levels. The ideas, techniques, and checklists in this introductory-level course apply to all forms of business writing: memos, reports, brochures, proposals, presentations, catalogs, and websites. This course will also teach how to revise for wordiness, unnecessary phrases, redundancy, and jargon, and the appropriate use of email in an organizational setting.

Duration:

5 hours

Course Code:

IHRDC_BEES_305

Content:

- Recognize the difference between ineffective and effective writing
- List and define the four major factors of effective writing (clarity, tone, organization, and delivery)
- Recognize the role of the audience in effective communication and the importance of understanding an audience's needs
- Employ formal and informal outlining techniques
- List and recognize techniques for overcoming writer's block
- Recognize the importance and dangers of writing quickly
- Revise for wordiness, unnecessary phrases, redundancy, and jargon
- Write more effective emails and recognize the appropriate use of email in an organizational setting
- Employ checklists for organizing, writing, and revising

Introduction to Negotiations

Description:

Every day we are involved in negotiations of one form or another. Even though negotiations are an integral part of our lives, techniques for managing these situations are not instinctive; they must be learned.

Duration:

4 hours

Course Code:

IHRDC_BEES_44

Content:

- Negotiation Defined
- Principled Negotiation
- Distributive Negotiation
- Intergrative Negotiation
- Mixed Motive Negotiation
- BATNA (Best Alternative to No Agreement)
- Reservation Price and ZOPA (Zone of Possible Agreement)
- Negotiation Strategy and Planning
- Finding and Using Negotiation Power
- Top Ten Negotiation Impasses and Challenges

CREATIVITY AND INNOVATION

Creativity in Teams and Organizations

Description:

This course looks at spurring creativity and innovation in teams and organizations. Drawing on the latest academic thinking, it outlines the key factors for creative teams.

Duration:
4 hours

Course Code:
IHRDC_BEES_324

Content:

- Creativity in Teams and Organizations
- The Six "I"s of Innovation
- Other Aspects of Innovation
- Sparking Creativity in a Team
- Diversity and Empowerment in Creative Teams
- Group Creativity Tools
- Group Tools: Brainstorming
- Group Tools: Braindrawing
- Group Tools: Discussion 66
- Group Tools: NGT and Anonymous Idea Generation Technique
- Group Tools: Edward de Bono's Provocation Technique
- Group Tools: SCAMPER
- Group Tools: Visioning
- Jump Starting Group Creativity
- Creating a Creative Climate
- Creative Barriers
- Collaborative Innovation

Innovation in Teams and Organizations

Description:

This course looks at innovation in corporations and the public sector. It reviews the latest academic thinking on innovation, including Clay Christensen's seminal thinking on disruptive technology and the proper response.

Duration:
5 hours

Course Code:
IHRDC_BEES_325

Content:

- Innovation in Teams and Organizations
- The Innovator's Dilemma and the Innovator's Solution
- Innovation and Entrepreneurship
- Types of Innovation
- Incremental and Semi-Radical Innovation
- Radical Innovation
- Innovation Tools: Idea Champions and Idea Orchestrators
- Innovation Tools: Idea Incubators
- Innovations Tools: New Venture Teams and Funds
- Innovations Tools: Skunk Works
- Leading Organizations for Innovation
- Public Sector Innovation

CREATIVITY AND INNOVATION

Introduction to Critical Thinking

Description:

This course is an introduction to the importance of critical thinking in the business world. Critical thinking is an intellectual model for reasoning through issues to reach well-founded conclusions about them. Asking questions is at the heart of critical thinking.

Duration:
7 hours

Course Code:
IHRDC_BEES_322

Content:

- What is Critical Thinking?
- Systematic Problem Solving
- Barriers to Critical Thinking
- Self Assesment

Personal Creativity

Description:

This course addresses Personal Creativity. Through tools and exercises drawn from Adrian Brown's book, Creativity & Innovation, it seeks to help unlock the creativity within individuals.

Duration:
4 hours

Course Code:
IHRDC_BEES_323

Content:

- The Creative Self
- An Introduction to this Course
- An Introduction to Creativity
- The Creative Spirit
- Creativity warm-up
- Creative thinking
- Tools: Edward de Bono's Lateral Thinking
- Tools: 6 thinking hats
- Tools: "Po" Statements
- Tools: mirror image
- Tools: mind mapping
- Tools: Tony Buzan on mind mapping
- Tools: DO IT
- Creative qualities
- Personal Creativity
- Measuring creativity

DATA ANALYTICS

Introduction to Data Analysis

Description:

Whatever your profession. Whatever your field. As a professional, and certainly as a leader, you will be asked to make a decision based on data. This course will introduce the different types of decisions made in an organizational setting, why quantitative analytics is important, and how data quality can affect decision making. Since quantitative analytics is used in various settings, this intermediate-level course also offers insight into how research is used in different sectors. From a management perspective, the course highlights appropriate quantitative methods and ways to ensure quality and accuracy through research design.

Duration:
5 hours

Course Code:
IHRDC_BEES_1554

Content:

- Explain why quantitative analysis and analytics is important in decision making
- Explain the types of decisions that can be made analytically in an organizational setting
- Describe different decision making models and tools
- Identify the fundamental concepts of measurement including levels of measurement, reliability and validity, errors, measurement and information bias
- Explain how quality data affects decision making (GIGO principle)
- Describe methods of ensuring the quality of data
- Evaluate techniques for ensuring accurate research design
- Describe how research is used in different settings: business, education, health care, the military, government, nonprofits
- Explain data management techniques including transforming data, recoding data, and handling missing data
- Apply appropriate decision making techniques to a specific case

Statistics as a Managerial Tool

Description:

Managing today can require good instincts. However, instinct is not enough to manage the huge amounts of available data and the complex variables of the business world. Statistics can help managers and leaders make sense of these complexities, back-up their assertions, and feel confident about when to take the risks and when to pump the breaks. This intermediate-level course examines statistics as a managerial tool. It also looks at common graphical representations of data and how these can be effective tools to explain situations and support persuasive arguments for a course of action.

Duration:
5 hours

Course Code:
IHRDC_BEES_1556

Content:

- Describe how statistics are used in different settings
- Describe common problems with, and misuse of, statistics
- Identify criteria for evaluating statistics
- Explain the key fundamentals of probability and their real-world application
- Identify the fundamental concepts of descriptive statistics (populations and samples, measures of central tendency, measures of variability, measures of distribution) and their real-world application
- Select appropriate graphic methods for displaying descriptive statistics
- Explain the fundamental concepts of inferential statistics and their real-world application
- Evaluate a scenario in order to determine the appropriate statistic to use
- Apply fundamental statistics to a real-world situation
- Evaluate the appropriateness of statistics used
- Use statistics to identify the most appropriate decision alternative
- Translate statistical data into a graphical presentation based on a brief case study

DATA ANALYTICS

Tools of Data Analysis

Description:

There are a number of statistical tools and techniques that are commonly used by organizations to inform decision-making. These tools span numerous business functions and support many different objectives. This intermediate-level course describes, evaluates, and analyzes different statistical techniques and their real-world limitations and benefits. The course features crossover analysis, break-even analysis, cluster analysis, decision tree analysis as well as an introduction to regression.

Duration:
5 hours

Course Code:
IHRDC_BEES_1555

Content:

- Evaluate the usefulness of different statistical techniques and their real-world application
- Describe the various forecasting techniques and the benefits and limitations
- Describe the various types of regression analysis and their real-world application
- Analyze the results of a regression analysis
- Describe common problems with multiple regression
- Describe other statistical techniques and their real-world application
- Explain the advantages and disadvantages of various statistical techniques
- Choose a statistical technique based on a brief case study

Statistical Process Control

Description:

Statistical Process Control is all about boosting quality. Quality management can not only deliver value to customers and stakeholders, it can also enable data-driven decision making that helps organizations gain a competitive advantage in the marketplace. This intermediate-level course will introduce the basics of quality management, explaining the difference between quality control and quality assurance, providing methods for application of analysis, showing different applications of the Seven Basic Quality Tools. It all culminates in a brief case study, which illustrates the concepts covered.

Duration:
5 hours

Course Code:
IHRDC_BEES_1125

Content:

- Describe principles that help guide quality management activities
- Use the Plan-Do-Check-Act cycle to coordinate work and implement change
- Explain the differences between quality control and quality assurance
- Create a SIPOC diagram to help visualize work as a process
- Explain the role that metrics and statistics play in measuring and controlling work processes
- Apply analysis and planning approaches to quality
- Explain how the Seven Basic Quality Tools are used to monitor and control quality processes
- Use the Seven Basic Quality Tools to process and sort non-numerical data
- Use the Seven Basic Quality Tools in combination to create powerful plans and solutions to quality problems
- Describe various quality management programs
- Employ quality management tools based on a brief case study

DATA ANALYTICS

Data Analysis in the Real World

Description:

How are data-driven decisions put into practice in the real world? How do these decisions differ when applied to different sectors, such as health care, education and government? This intermediate-level course will provide answers to these questions as well as recommendations for decision-making based on data analytics for each sector. The course will begin with an introduction of Big Data, then continue into a deeper dive on its implications within each sector. Industry case studies make the concepts applicable in the real-world.

Duration:
5 hours

Course Code:
IHRDC_BEES_1126

Content:

- Explain the management implications of the use of business intelligence and knowledge management systems
- Define Big Data and describe its current uses for analysis and future potential and its implications
- Explain common analytics for business and quality improvement
- Recommend manufacturing business decisions based on data analytics
- Explain common analytics used in health care
- Recommend health care decisions based on data analytics
- Explain common analytics used in education
- Recommend educational decisions based in data analytics
- Explain common analytics used in government
- Recommend governmental decisions based on data analytics

Data Analysis for Improving Organizational Performance

Description:

When using data analysis to improve organizational performance, it's vital to employ the tools that bring the data to life and keep people engaged in the process. Organizations in both the public and private sectors often use tools and frameworks to deliver the data, and the information the data might suggest, to its staff. This intermediate-level course will explain some of these measures and tools, describe some specific measurements, and explain the relationship between assessment and strategy. Summarizing the data with the correct tool can be the gating factor to reaching staff and effecting changes that spur performance improvement.

Duration:
5 hours

Course Code:
IHRDC_BEES_1127

Content:

- Explain how performance measures are used in different settings
- Differentiate among various organizational performance measurements
- Describe the advantages and disadvantages of KPIs
- Describe the advantages and disadvantages of the Balanced Scorecard
- Describe the advantages and disadvantages of a Net Promoter Score
- Explain the relationship between performance assessment and organizational tactics and strategy
- Assess the validity of performance measures for an organization based on a brief case study

ENTREPRENEURSHIP

Introduction to Entrepreneurship

Description:

Having an entrepreneurial spirit and a good idea is a great foundation to starting your own business. But you may need a bit more to succeed. This course explores the different aspects of entrepreneurship and how entrepreneurs create and establish successful new ventures. It reviews issues and activities involved in starting a new business, including the decisions that must be made before an enterprise can be launched and established.

Duration:
5 hours

Course Code:
IHRDC_BEES_310

Content:

- Describe the characteristics of a successful entrepreneur
- Outline the eight stages of the entrepreneurial process
- Explain the discovery stage
- Describe the evaluation of the market for a new venture
- Outline ways to structure the venture
- Discuss the strategic planning process for an entrepreneur
- Describe the operational and financial planning needed for a new venture
- Outline how an entrepreneur develops and employs a business plan
- Describe the options for funding the new venture
- Discuss issues in implementing the plans for a new venture
- Recognize the ethical issues faced by entrepreneurs

Leadership and Management for Entrepreneurs

Description:

This course explores the leadership and management issues entrepreneurs face as they create and establish successful new ventures. It reviews the key managerial roles of planning, organizing, staffing, leading and controlling and their application in entrepreneurial settings. Further, the course addresses self-management for the entrepreneur--how an entrepreneur can manage his or her own time and maintain a proper work-life balance.

Duration:
5 hours

Course Code:
IHRDC_BEES_314

Content:

- Describe the managerial roles played by an entrepreneur
- Outline the five key managerial activities
- Describe self-management techniques for managing time and organizing, planning, and prioritizing
- Discuss the autocratic (ODS-A), participative (ODS-P), and empowering (GEM) management styles and their application
- Describe the process for staffing an entrepreneurial venture
- Discuss Katzenbach's Five Motivational Paths and how they apply to new ventures
- Describe the process for coaching employees
- Outline the USED Model for training employees
- Discuss the importance of active listening when communicating with employees

ENTREPRENEURSHIP

Business Law for Entrepreneurs

Description:

When starting a new venture, understanding the relevant laws can make or break your success. This course covers the basics of business law for an entrepreneur. It reviews legal structures for a new venture, intellectual property, employment law, contracts, government regulation, and personal and real property.

Duration:
5 hours

Course Code:
IHRDC_BEES_311

Content:

- Understand basic legal terminology and the larger legal environment
- Identify and distinguish among the three basic legal structures of business organization
- Explain the advantages and disadvantages of a sole proprietorship
- Understand the rules and liabilities involved in a partnership
- Discuss the advantages and disadvantages of a corporation, and the steps necessary to incorporate
- Distinguish between a general partnership and a limited partnership or a limited liability partnership
- Explain the differences between S corporations and limited liability companies
- Identify the three major types of franchises and discuss the pros and cons of franchising
- Explain the major legal protections for intellectual property rights
- Define and distinguish between patents and copyrights
- Discuss the importance of trademarks
- List the criteria that define a trade secret
- Identify the areas of employment law that are most relevant to entrepreneurs
- Define the four legal elements involved in forming a contract
- Discuss the Statute of Frauds and the types of contracts to which it applies
- Explain Article 2 of the Universal Commercial Code and how it applies to sales contracts
- Understand the basics of tax law as it applies to a business
- Identify the major areas of federal regulation that apply to businesses
- Understand basic legal principles applying to personal property
- Understand basic legal principles applying to real property
- Identify the legal means for transferring ownership of real property
- Identify the three types of bankruptcy defined under federal law

Strategic Marketing for Entrepreneurs

Description:

This course reviews the strategic issues that an entrepreneur faces while starting a new venture or business, and highlights the questions about market acceptance that must be answered during every stage of the entrepreneurial process.

Duration:
5 hours

Course Code:
IHRDC_BEES_313

Content:

- Describe the role of strategy and marketing in an entrepreneurial setting
- Discuss the basics of strategy, including the three levels of strategy and the five competitive forces identified by Michael Porter
- Explain marketing basics, including the marketing process and the Four P's
- Discuss the role of marketing in the discovery stage of a new venture
- Describe the evaluation of the market for a new venture, including market segmentation, target marketing, and exploring customer needs
- Discuss the role of strategic planning in the entrepreneurial process
- Describe the key elements of a marketing plan
- Outline the factors for success in creating a new venture business plan

FINANCE

Introduction to Finance

Description:

Understanding basic finance is important for any managerial position, even non-financial managers. This introductory-level course starts at the beginning, discussing finance as an organizational setting and legal forms of business. The course continues on to cover the responsibilities of financial managers, roles of finance in a typical business organization, and relevant financial markets of interest to financial managers. Further, the course will discuss corporate financing and the role the stock market plays in the business world.

Duration:
3 hours

Course Code:
IHRDC_BEES_1023

Content:

- Identify and differentiate the three most common types of business organizations and the structure of each
- State the fundamental objectives of a corporation and the differences between wealth and profit maximization
- Recognize the impact of social and ethical responsibility on business
- Identify and describe the structure and functions of the finance department within an organization
- Define the principal-agent relationship and strategies for overcoming conflicts of interest and motivating managers
- List and define the five key principles that form the foundation of financial management
- Recognize and define the five key financial markets
- Identify the sources, rules, and life-cycle stages of corporate financing
- Describe the function of the stock market and the three trading venues it utilizes
- Recognize the factors related to interest rate determination and the impact of interest on an organization

Time Value of Money and Risk

Description:

Is a dollar more valuable today or tomorrow? What about a year from now? This introductory-level course covers time value of money (TVM) principles and risk and return. You will review the basic TVM techniques used in evaluating all financial decisions and their cash flow implications. For Risk and Return, you will learn how risk influences investment decisions, and how to calculate risk and rates of return. Further, you will explore the benefits of diversification and the use of the portfolio concept in investing.

Duration:
3 hours

Course Code:
IHRDC_BEES_1164

Content:

- Distinguish between points in time and periods of time as shown by a time line
- Define compounding and discounting
- Compute future value or present value for single payment amounts
- Distinguish between single payments and streams of payments and between uneven streams and annuities
- Solve for the interest rate or time period for simple present value and future value problems
- Define risk
- Describe how risk influences investment decisions
- Calculate risk and rates of return
- Describe how diversification can limit risk
- Explain how diversifiable risk can be lowered using a portfolio approach

FINANCE

Understanding and Managing Budgets

Description:

A budget is a detail of expenses and incomes for a set period of time. This introductory-level course covers budgets and how they are used in organizational settings including the uses and functions of master budgets, operating budgets, sales, production and cost of goods sold budgets, and cash budgets. You will also learn about the budgeting process, and how organizations are using different budgeting techniques to overcome operating challenges.

Duration:
3 hours

Course Code:
IHRDC_BEES_1165

Content:

- Recognize the uses and functions of budgeting
- Recognize the key activities, considerations, and benefits of strategic organizational planning
- Recognize the purpose and make-up of a master budget
- Identify the components and calculations used to create a master budget and recognize uses for this information
- Identify the components and purpose of an operating budget
- Recognize how sales, production, and cost of goods sold budgets are created and perform related calculations
- Recognize the purpose of cash budgets and how they are prepared
- Identify ways the budget process can be managed for optimal results and recognize the benefits and limitations of the management-by-objective system

Introduction to Business Statistics

Description:

This course will introduce you to the importance of statistics in the business world. Statistics is the science of collecting, organizing, and analyzing data in order to make more effective decisions. Understanding statistical techniques can help any manager responsible for marketing, management, accounting, sales, or other business functions.

Duration:
4 hours

Course Code:
IHRDC_BEES_1024

Content:

- Differentiate between descriptive and inferential statistics
- Distinguish between the 4 different scales of measurement: nominal, ordinal, interval, and ratio
- Identify the appropriate graphical or tabular method for presenting your data
- Create frequency distributions
- Create meaningful presentations and graphs
- Calculate probability and explain its practical application
- Compute the mode, median, and mean of a dataset
- Calculate the variance and standard deviation of a dataset
- Interpret sampling with and without replacement
- Explain the significance of the area under a curve

FINANCE

Accounting and Finance for Entrepreneurs

Description:

This course provides an introduction to key topics in accounting and finance for those involved in new ventures. It reviews financial accounting basics, including GAAP Principles and financial statements, and also covers key issues in finance, broadly defined as any financial or monetary activity that involves a company.

Duration:
5 hours

Course Code:
IHRDC_BEES_192

Content:

- Understand and explain the assumptions and principles that underlie Generally Accepted Accounting Principles (GAAP)
- Understand and explain the rules of double-entry accounting
- Calculate the balance of the account
- Define the steps that make up the accounting cycle
- Describe the relationship between the major financial statements that make up an annual report
- Explain the role of finance in the entrepreneurial process
- Understand the importance of budgeting and financial planning
- Identify and explain the three major pricing strategies
- Define and distinguish between fixed and variable costs
- Calculate the components of a master (static) budget
- Prepare a cash budget
- Prepare and analyze pro forma financial statements
- Develop a basic financial plan
- Use pro forma financial statements to evaluate a new venture
- Explain the factors and assumptions involved in break-even analysis
- Calculate Return on Investment (ROI) and payback period

How To Read A Financial Statement

Description:

Financial statements can look intimidating and, as a non-financial manager, you may feel like ascertaining the right conclusion from a financial statement is like finding a needle in a haystack. This course covers financial reports and their meaning. You will learn the fundamentals and importance of the income statement, balance sheet, and statement of cash flows, and how they can be used to manage a business. You will also be exposed to financial (ratio) analysis.

Duration:
5 hours

Course Code:
IHRDC_BEES_1002

Content:

- Identify and describe the documents and financial statements included in an organization's financial report
- Itemize and interpret the information in the income statement, balance sheet, statement of changes in shareholders' equity, and statement of cash flows
- Correctly state the impact of specific business activities on cash flow
- Define financial (ratio) analysis and explain its objectives and limitations
- Identify the various types and categories of financial ratios
- Perform calculations using financial ratios

FINANCE

Financial Planning and Control

Description:

Decision-making within an organization often hinges on the numbers. So what financial tools do managers need to be familiar with to make sound, defensible decisions? This introductory-level course is meant to teach finance concepts to non-financial managers, and considers tools for decision-making such as cost benefit analysis, break even analysis, and Balanced Scorecard. The course also teaches the basic finance concepts such as return on investment (ROI), fixed and variable costs, and payback period.

Duration:

5 hours

Course Code:

IHRDC_BEES_1135

Content:

- Explain cost benefit analysis
- Calculate return on investment and the payback period
- Explain fixed and variable costs
- Calculate break even and understand CVP (cost-volume-profit) analysis
- Explain tracking and performance measures
- Explain and calculate Balanced Scorecard measures

HUMAN RESOURCES MANAGEMENT

Employee Safety

Description:

The safety of employees should be a primary concern for employers. Human resource managers play a crucial role in ensuring workplaces are not only as safe as possible, but also in compliance with safety-related rules and guidelines. This course introduces various workplace hazards and health issues and explores the relationship between employers and the Occupational Safety and Health Administration (OSHA).

Duration:
3 hours

Course Code:
IHRDC_BEES_1517

Content:

- Explain the importance of workplace safety from an organizational and ethical perspective
- Describe the key provisions of occupational safety laws
- Navigate OSHA standards, investigations, and record keeping protocols
- Understand the rights of employees and employers protected by OSHA
- Recognize the types of workplace hazards from which workers should be shielded
- Explain workplace issues surrounding substance abuse and stress

Introduction to Human Resource Management

Description:

Explains Human Resource Management and discusses its role and value in an organization. You will learn the key HRM functions and concepts, its strategic contribution to the organization and understand the role of HRM planning. Ethical, cultural, political and logistical HRM issues are also addressed.

Duration:
2 hours 30 minutes

Course Code:
IHRDC_BEES_379

Content:

- Fundamentals
- Attitudes about Human Resource Management
- The Strategic Importance of HRM
- HRM Vocabulary Game
- Key HRM Functions and Concepts
- Reading
- Centralized and Decentralized HRM
- HRM Planning
- HRM and Ethics
- Global HRM Issues
- RIGS: Making the Case for HRM (mini-case)
- Web Research: HR Association Resources
- Practice Self-Assessment
- Self-Assessment
- For Further Exploration

HUMAN RESOURCES MANAGEMENT

Compensation and Benefits

Description:

Understanding compensation practices and policies is crucial for any business owner, HR professional, or manager. In this introductory-level course, you will consider issues surrounding the key aspects of pay policy: legal requirements, pay equity within an organization, competitive pay within the relevant industry, how and when to grant raises, and different ways payment can be structured. Earn SHRM and HRCI credit as you develop your compensation expertise.

Duration:
3 hours

Course Code:
IHRDC_BEES_336

Content:

- Comply with relevant state and federal ""wage and hour"" laws
- Determine the competitive pay level for a particular position in a particular geographic location
- Discuss and administer a variety of pay structures
- Effectively confront issues of pay equity within an organization

Data and Human Resource Management

Description:

Big data and data analytics are changing how businesses run and managers do their jobs. In this course, you will explore how human resource managers use data to provide better support to the employees they manage and to contribute to the strategic practices of their organizations. You will learn about different kinds of data and analyses, and you will consider how data collection and organization may factor into problem-solving processes. We will also review issues pertaining to data collection and employee privacy and confidentiality.

Duration:
3 hours

Course Code:
IHRDC_BEES_1233

Content:

- Explain the value of big data and analytics for human resource managers
- Identify different types of data that are useful for human resource managers
- Describe various ways of analyzing data
- Perform simple data analyses and understand some basic analytic tools
- Develop a plan for collecting data
- Understand the advantages and disadvantages of certain data types and collection methods
- Distinguish between correlation and causation
- Identify some biases and errors data collection may be subject to
- Present data in clear and compelling ways
- Consider the advantages and disadvantages of different ways to store data
- Reflect on some of the threats of big data, including threats to confidentiality and privacy as well as the potential for discrimination

HUMAN RESOURCES MANAGEMENT

Employee Rights

Description:

From establishing an ethics code to handling disciplinary issues, human resource managers play a key role in protecting the rights of employees by ensuring they are treated fairly, and that appropriate laws and policies are enforced. In this course, you will learn about issues relating to employee rights in the workplace. We'll consider the relationship between HR and ethics, employment laws that protect the rights of workers, and appropriate procedures for disciplining and terminating employees. The second half of the course will focus on unions and labor relations.

Duration:
3 hours

Course Code:
IHRDC_BEES_1518

Content:

- Describe the HRM role in establishing and maintaining an organization's ethical standards
- Understand the importance of developing an employee privacy policy
- Describe the elements of a progressive discipline system
- Deal appropriately with a variety of issues surrounding an employee's termination
- Understand the issues of working within union and non-union environments
- Explain the procedures for certifying, decertifying, and deauthorizing unions
- Describe fair and unfair labor practices
- Discuss various methods for resolving impasses during collective bargaining

PHR® Exam Prep Course

Description:

This completely online and self-paced, six-module Human Resources management course provides a comprehensive preparation for the Professional in Human Resources (PHR®) certification exam. The course includes exam-taking tips, a detailed diagnostic test, practice questions at the end of each module, and a full-length, 175-question practice exam. A total of 365 practice questions address the six knowledge areas covered in the PHR® exam.

Duration:
25 hours

Course Code:
IHRDC_BEES_1549

Content:

- Business Management and Strategy
- Workforce Planning and Employment
- Human Resource Development
- Compensation and Benefits
- Employee and Labor Relations
- Risk Management

HUMAN RESOURCES MANAGEMENT

Employee Selection

Description:
Reviews how to conduct an effective job interview, reference checks and how to select appropriate pre-employment tests.

Duration:
2 hours 30 minutes

Course Code:
IHRDC_BEES_337

Content:

- Finding the Right Person
- Mini-case: Interviewing for Pacific Machine Tools
- Employee Fit
- Testing Prospective Employees
- Individual Exercise: Evaluating an Integrity Test
- Mini-case: A Hiring Dilemma
- HR Vocabulary Game
- Practice Self-Assessment
- Self-Assessment

Performance Management

Description:
Explains the value of a performance management system and discusses various types of systems. You will learn how to conduct a performance management interview and how to design a performance improvement plan.

Duration:
2 hours 30 minutes

Course Code:
IHRDC_BEES_338

Content:

- Performance Evaluation Characteristics
- Performance Management Systems
- Fair Measurements
- The Appraisal Process
- Handling Appraisal Results
- Performance Management Solutions
- Vocabulary Game
- Practice Self-Assessment
- Self-Assessment

HUMAN RESOURCES MANAGEMENT

Talent Management and Career Development

Description:

Considers the critical value of a career development program to an organization. You will learn the five stages in the career lifecycle and the needs of an employee at each stage. Key tools for career development are discussed and compared.

Duration:

2 hours 30 minutes

Course Code:

IHRDC_BEES_340

Content:

- Why Career Development?
- Career Life-cycle
- Tools for Career Development
- Generational Issues
- Career Development Issues
- Career Questions
- Summary and Additional Reading
- Practice Self-Assessment
- Self-Assessment

Equal Employment Opportunity

Description:

Reviews the major employment and anti-discrimination laws as well as the basic steps to take in dealing with discrimination complaints. You will learn ways to develop and maintain a diverse workforce.

Duration:

2 hours 30 minutes

Course Code:

IHRDC_BEES_339

Content:

- Equal Opportunity and Employment Issues
- Mini-case: Discrimination at Pacific Machine Tools?
- Mini-quiz: Discrimination
- Mini-case: Making a Choice on Promotion at Pacific Machine Tools
- Alternate Work Arrangements at Pacific Machine Tools
- Web Research and Essay: Diversity in the Workforce
- Practice Self-Assessment
- Self-Assessment

INTERNATIONAL TRADE

Global Business Management

Description:

This self-paced Global Business Management course reviews knowledge for the NASBITE Certified Global Business Professional™ exam. It provides a comprehensive preparation including an in-depth review of knowledge areas, exam taking tips, module quizzes, and a full-length 200-question Practice Exam covering the CGBP™ areas of knowledge.

Duration:
4 hours

Course Code:
IHRDC_BEES_401

Content:

- Global Mission Statement
- Ethical and Cultural Issues
- Global Business Planning and Strategy
- Ethical and Cultural Issues
- Research
- Risk Assessment and Mitigation
- Compliance
- Budgeting
- Support Organizations
- Technology

Global Marketing

Description:

This self-paced Global Marketing course reviews knowledge for the NASBITE Certified Global Business Professional™ exam. It provides a comprehensive preparation including an in-depth review of knowledge areas, exam taking tips, module quizzes, and a full-length 200-question Practice Exam covering the CGBP™ areas of knowledge.

Duration:
4 hours

Course Code:
IHRDC_BEES_404

Content:

- Course Outline
- Evaluating Market Threats and Opportunities
- The Global Marketing Plan
- The Global Marketing Plan: Market Selection
- The Global Marketing Plan: Market Strategy
- The Global Marketing Plan: Marketing Budget
- The Marketing Mix: Product
- The Marketing Mix: Price
- The Marketing Mix: Promotion
- The Marketing Mix: Placement
- Global Sales Techniques

INTERNATIONAL TRADE

Global Supply Chain Management

Description:

This online and self-paced Global Supply Chain Management prepares learners to take NASBITE's Certified Global Business Professional™ exam. It includes an in-depth review of the Global Supply Chain Management knowledge area aligned with NASBITE's practice delineation, exam taking tips, module quizzes, and a 25-question Practice Exam covering the Global Supply Chain Management area of knowledge.

Note: For a comprehensive NASBITE CGBP™ Exam Prep course, register for the full suite of International Trade courses, which includes Global Business Management, Global Supply Chain Management, Global Marketing, and Global Trade Finance.

The course provides an overview of essential skills for managing supply-chain logistics in an international business context. It covers practical applications of supply-chain management including: transportation modes; taxes, duties and quotas; trade agreements; packaging requirements; use of intermediaries; documentation requirements; legal and regulatory requirements; insurance; trade conventions; and the offshore procurement process.

Duration:
4 hours

Course Code:
IHRDC_BEES_402

Content:

- Supply Chain Solutions
- Logistics
- Documentation
- Insurance
- Ground Transportation
- The Procurement Process

Global Trade Finance

Description:

This completely online and self-paced Global Trade Finance course reviews knowledge for the NASBITE Certified Global Business Professional™ exam. It provides a comprehensive preparation including an in-depth review of knowledge areas, exam taking tips, module quizzes, and a full-length 200-question Practice Exam covering the CGBP™ areas of knowledge.

Duration:
4 hours

Course Code:
IHRDC_BEES_403

Content:

- Assessing Foreign Exchange Risks
- Managing Risk
- Credit
- Methods of Payment
- Terms and Conditions
- Financial Plan
- Short Term Financing
- Medium- and Long-Term Financing

IT/CYBERSECURITY

Communication and Network Security

Description:

This course covers topics related to communications and network security. It begins with a lesson in the different types of networks and different transmission technologies. It also covers the two main models that govern how networks work: the OSI model and the TCP/IP model, as well as their related layers. The course includes a detailed discussion of the many protocols that allow networks and network devices to communicate with one another and includes a discussion of firewalls and wireless networks. This course is designed for IT professionals and other adult learners who are interested in gaining an introduction to information technology security.

The content in this course aligns with Domain Four in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1109

Content:

- Discuss the general concepts that enable networking and its role in information technology
- Compare the different types of networks, including LANs, WANs, and MANs, as well as the Internet, intranets, and extranets
- Explain what the Open Systems Interconnection (OSI) Reference Model is and identify its seven layers
- Contrast the OSI model with the TCP/IP Model
- Identify common protocols and differentiate between network, routing, and data link protocols
- Describe the functions of common networking devices, including bridges, routers, hubs, repeaters, switches, and firewalls
- Discuss how wireless networks work and the technology that enables them
- Identify common network attacks and how they can be prevented

Network Security Scenarios

Description:

This course examines communications and network security. It covers the different types of networks and different transmission technologies and the two main models that govern how networks work, the OSI model and the TCP/IP model, and their related layers. This course also features a number of fictional scenarios that will help you apply what you've learned to situations you may encounter in the real world. This course requires a basic understanding of IT concepts.

Duration:
5 hours

Course Code:
IHRDC_BEES_656

Content:

- Discuss the general concepts that enable networking and its role in information technology
- Compare the different types of networks, including LANs, WANs, and MANs, as well as the Internet, intranets, and extranets
- Explain what the Open Systems Interconnection (OSI) Reference Model is and identify its seven layers
- Contrast the OSI model with the TCP/IP Model
- Identify common protocols and differentiate among network, routing, and data link protocols
- Describe the functions of common networking devices, including bridges, routers, hubs, repeaters, switches, and firewalls
- Discuss how wireless networks work and the technology that enables them
- Identify common network attacks and how they can be prevented
- Analyze a real-world scenario and make appropriate recommendations to address and improve network security

IT/CYBERSECURITY

CISSP® Practice Exams and Exam Strategies

Description:

This course is designed to give learners an assessment of their readiness to take ISC2's CISSP® Exam. It contains two 120-question practice exams, which cover The International Information System Security Certification Consortium's eight domains:
1. Security and Risk Management
2. Asset Security
3. Security Engineering
4. Communications and Network Security
5. Identity and Access Management
6. Security Assessment and Testing
7. Security Operations
8. Software Development Security

Duration:
5 hours

Course Code:
IHRDC_BEES_1186

Content:

Security and Risk Management

Description:

This course covers the role of governance and risk management in information security. It looks at the policies and standards that are needed to operate an effective information security function and to oversee good information security practices. The course also includes a look at how modern organizations manage information security risks and how to conduct a risk analysis. It concludes by examining the process for providing information security training and education. This course requires some basic understanding of IT concepts. The content in this course aligns with Domain One in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1158

Content:

- Discuss the concept of security governance and understand the job of overseeing data security
- Describe the role of policy and procedure documents in information security
- Understand the key principles and terminology of information security governance and risk management
- Discuss different management practices for overseeing an effective information security function
- Identify common information security risks and threats
- Describe the process for conducting a risk assessment
- Understand the data classification process and properly classify data according to security needs
- Explain the process for providing information security training and education

IT/CYBERSECURITY

Security Engineering

Description:

This course contains an introduction to the key concepts of cryptography and security engineering. It examines the role of encryption in information security and considers common encryption methods. In addition, the course discusses ciphers, their substitutes, and how they work. Public key infrastructure and management is also covered. This course requires a basic understanding of IT concepts. The content in this course aligns with Domain Three in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1159

Content:

- Understand how cryptography works and its role in information security
- Compare and contrast different ciphers and explain how they work
- Create substitution ciphers and encode and decode cleartext and ciphertext
- Discuss how encryption enables secure transmission of sensitive data
- Explain and compare symmetric and asymmetric cryptography
- Describe the role of public key infrastructure and key management

Security Assessment and Testing

Description:

This course covers security assessment and testing, focusing on potential disruptions that can affect organizations and how they can be addressed with assessments and plans. Students will have the opportunity to practice how to assess the impact of disasters that may arise as well as to develop their own versions of these plans. This course requires a basic understanding of IT concepts.

Duration:
5 hours

Course Code:
IHRDC_BEES_1161

Content:

- Relate the many potential disasters and disruptions that can impact organizations and their information systems
- Describe the steps required in conducting a business impact assessment
- Explain the difference between a business continuity plan and a disaster recovery plan*
- Discuss different recovery strategies and how they fit into disaster recovery planning
- Understand the business continuity organization and its responsibilities
- Prepare a business continuity and disaster recovery plan
- Discuss how organizations test their BCPs and DRPs, and perform different exercises to prepare for disruptions

IT/CYBERSECURITY

Security Operations

Description:

This course contains a detailed overview of security operations: administrative controls, trusted recovery and change and incident management. This course establishes a foundation in auditing, monitoring and detection in information security. This course requires a basic understanding of IT concepts. The content in this course aligns with Domain Seven in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1162

Content:

- Understand the role of security operations and discuss its key themes
- Discuss several administrative controls and explain how they can improve information security*
- Compare different security controls and explain how they work
- Identify trusted recovery techniques
- Relate the steps required in effective incident management and response
- Discuss the role of auditing, monitoring, and detection in information security
- Describe the steps involved in a digital forensics investigation

Software Development Security

Description:

This course covers software development security while focusing on the systems development life cycle, operating systems, and their environments. Additional topics include the role of various databases in security and how to recognize and guard against attacks on software. Students will have the opportunity to apply application security controls. This course requires a basic understanding of IT concepts. The content in this course aligns with Domain Eight in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1163

Content:

- Discuss the role of security in software development
- Explain the systems development life cycle and compare its eight stages
- Understand what the operating system is and how it works
- Describe different application and operating environments
- Discuss the role of databases in information security and identify different database types
- Apply several application security controls
- Recognize several software-based attacks and describe methods to guard against them

IT/CYBERSECURITY

Cryptography Scenarios

Description:

This course contains an introduction to the key concepts of cryptography and security engineering. It examines the role of encryption in information security and considers common encryption methods. This course also features a number of fictional scenarios based on cryptography to help you apply the concepts to situations you may see in the real world. This course requires some basic understanding of IT concepts. This course is part of the Cybersecurity suite of courses. However, the course can be taken as a stand-alone course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1184

Content:

- Understand how cryptography works and its role in information security
- Compare and contrast different ciphers and explain how they work
- Create substitution ciphers and encode and decode cleartext and ciphertext
- Discuss how encryption enables secure transmission of sensitive data
- Explain and compare symmetric and asymmetric cryptography
- Describe the role of public key infrastructure and key management
- Apply concepts and knowledge to real-world scenarios that involve cryptographic challenges

CISSP® Exam Prep Course

Description:

The CISSP® Exam Prep Course prepares test-takers for the Certified Information Systems Security Professional exam, as administered by the International Information System Security Certification Consortium (ISC)2. The CISSP® certification is recognized worldwide and adheres to the strict standards of ISO/IEC 17024. As security breaches outpace the available pool of security experts, the need for information security professionals with proper certifications will continue to grow. Among other titles, obtaining the CISSP® certification prepares one for a position as a Security Analyst, Chief Information Security Officer, or as a Security Architect.

This course contains two 120-question practice exams, which cover The International Information System Security Certification Consortium's eight domains:

1. Asset Security
2. Communications and Network Security
3. Identity and Access Management
4. Security and Risk Management
5. Security Assessment and Testing
6. Security Engineering
7. Security Operations
8. Software Development Security

Duration:
40 hours

Course Code:
IHRDC_BEES_1215

Content:

- Discuss the foundational concepts of information security, such as the CIA triad
- Know the different information security frameworks
- Explain information security training and education
- Discuss the information life cycle
- Explain how information and data are classified
- Learn about data and information privacy
- Understand system and computer architecture
- Explain and compare symmetric and asymmetric cryptography
- Learn about physical security risks and mitigation
- Compare different types of networks
- Contrast the OSI model with the TCP/IP Model

CISSP® Exam Prep Course

- Identify and differentiate among network, routing, and data link protocols
- Describe the functions of common networking devices and how wireless networks work
- Evaluate different identification methods and technologies
- Assess and test various security controls
- Describe business continuity and disaster recovery plans
- Understand the role of security operations
- Identify trusted recovery techniques
- Relate the steps required in effective incident management
- Discuss the role of auditing, monitoring, and detection in information security
- Learn the steps of a digital forensics investigation
- Explain the software development life cycle
- Discuss the role of databases in information security
- Recognize several software-based and network attacks

IT/CYBERSECURITY

Threats and Vulnerabilities Scenarios

Description:

This course examines the process of identifying and mitigating threats and vulnerabilities in information systems. It covers common categories of threats and vulnerabilities and the resources used to detect them. This course also features a number of fictional scenarios based on threats and vulnerabilities. This course is designed for IT professionals and other adult learners who are interested in information technology security, with an eye towards handling real world scenarios.

Duration:
5 hours

Course Code:
IHRDC_BEES_1218

Content:

- Discuss the role of governance and auditing in identifying threats and vulnerabilities
- Identify common vulnerabilities and how penetration testing and other methods can reveal them
- Explain how threats and vulnerabilities factor into risk analysis and lead to differing risk management strategies
- Describe the difference between quantitative and qualitative risk analysis
- Evaluate different security controls such as firewalls, IDS, IPS, antimalware and patch management
- Identify common threats and other attacks on networks and their hosts
- Respond appropriately to threats and vulnerabilities raised in real-world scenarios

Introduction to Cloud Computing and Cybersecurity

Description:

This course is comprised of two modules. The first provides an introduction to cloud-based services and the accompanying need for cybersecurity. The second module provides a series of real-world scenarios in which the learner must apply several of the concepts covered in the first module. Although this is an introductory course, learners should have some basic understanding of IT concepts. This course follows the structure of the (ISC)2 Certified Cloud Computing Professional certification. While it is intended as the first of a five-course suite, it can be taken as a stand-alone course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1238

Content:

- Describe the differences between cloud-based and traditional computing environments
- Identify the three major service categories of cloud computing
- List the different actors of the cloud-computing architecture
- Understand the need for cybersecurity and its role in cloud computing
- Apply what you have learned to real-world scenarios involving cybersecurity and cloud computing

IT/CYBERSECURITY

Cloud Data Security

Description:

This course is comprised of two modules. The first addresses many of the important concepts of cloud-based data and the security responsibilities of both cloud consumers and cloud service providers. The second module offers a series of scenarios that relate to cloud data security to ensure you have mastered the material. This course follows the structure of the (ISC)2 Certified Cloud Computing Professional certification. While it is intended as a part of a five-course suite, it can be taken as a stand-alone course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1239

Content:

- Describe the cloud data lifecycle
- Compare and contrast cloud data storage and capabilities to those of traditional computing
- Identify data loss prevention controls
- Describe the purpose of Data Rights Management and its role in cloud computing
- Apply what you have learned to real-world scenarios involving cybersecurity and cloud computing

Cloud Infrastructure & Platform Security

Description:

This course is comprised of two modules. The first addresses many of the challenges for both cloud consumers and cloud service providers in securing the infrastructure and platforms used in cloud computing. The second module offers a series of real-world scenarios designed to give learners a sense for how the concepts might be applied in their everyday work. This course is designed for IT professionals and other adult learners who have some knowledge of internet-related technology. This course follows the structure of the (ISC)2 Certified Cloud Computing Professional certification. While it is intended as a part of a five-course suite, it can be taken as a stand-alone course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1240

Content:

- Identify the three main components of the Cloud Infrastructure
- Recognize the seven layers of the Open Systems Interconnection model and how each cloud service category relates to them
- Describe various controls available in securing the cloud infrastructure
- Explain the role of identity and access management in cloud computing as well as understanding how different technologies work
- Understand the role of Business Continuity in ensuring the security of the cloud infrastructure and platforms
- Apply what you have learned to real-world scenarios involving cybersecurity and cloud computing

IT/CYBERSECURITY

Cloud Application Security

Description:

Cloud computing and cloud-based applications are more prevalent today than ever before. Software developers must continuously challenge themselves to stay up to date securing cloud-based applications. This course begins by presenting several challenges and solutions for securing cloud-based applications. Learners are then presented with several real-world scenarios to apply the material they've learned. This course follows the structure of the (ISC)2 Certified Cloud Computing Professional certification. While it is intended as a part of a five-course suite, it can be taken as a stand-alone course. This course assumes a basic understanding of internet technology.

Duration:
5 hours

Course Code:
IHRDC_BEES_1241

Content:

- Describe the different stages of the Software Development Lifecycle and how they apply to cloud applications
- Understand the role of identity and access management in cloud computing
- Identify different means of authentication
- Describe the various vulnerabilities of cloud applications
- Apply what you have learned to real-world scenarios involving cybersecurity and cloud computing

Cloud Operations Security

Description:

This course begins by covering security issues with regard to operating cloud services. While it covers many aspects relevant to a cloud service provider, it should be particularly valuable to helping cloud consumers understand how security responsibilities may be divided between consumer and provider. The second module engages the learner with real-world scenarios that represent the challenges to securing cloud operations. This course is designed for IT professionals and other adult learners who have some knowledge of internet-related technology. This course follows the structure of the (ISC)2 Certified Cloud Computing Professional certification. While it is intended as a part of a five-course suite, it can be taken as a stand-alone course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1242

Content:

- Identify the considerations choosing data center site
- Explain ways to implement physical security
- Describe the various considerations for securing hardware and networking resources
- Understand the vulnerabilities and mitigation strategies for securing the management plane of a cloud facility
- Describe the steps involved in creating a business continuity plan for a data center
- Explain the role and requirements of forensics in a cloud facility
- Apply what you have learned to real-world scenarios involving cybersecurity and cloud computing

IT/CYBERSECURITY

Introduction to Malware

Description:

Malicious software, better known as malware, has become a central element in not just cybersecurity but daily life. It has played a role in everything from our politics to our economy, to our personal lives. However, it remains a poorly understood and reported subject. This course provides a clear and comprehensive introduction to malware and how to defend against it. Instruction is divided into two modules. The first provides an overview of the history and mechanisms of malware. The second module offers a series of real-world scenarios in which the learner must apply several of the concepts covered in the first module.

Duration:
5 hours

Course Code:
IHRDC_BEES_1313

Content:

- Identify how malware attacks systems
- Describe the different components of malware
- Explain how malware gets onto computers and how it gets executed
- List the different types of malware
- Identify different tools and strategies to protect against malware
- Explain what to do if infected by malware

A Manager's Guide to Information Technology

Description:

MindEdge's A Manager's Guide to Information Technology course is designed to help managers develop a solid understanding of the basic concepts and technologies that they will encounter in the information technology field. Learners in this course will expand their knowledge of IT through games, videos, interactive exercises, quizzes, and other engaging content. Topics of major concern to managers are discussed throughout the course and include big data, cloud implementations, and mobile computing. Learners will combine these with business concepts in order to better inform business decisions. Examples of real-world cases involving IT security and other relevant topics are also incorporated to further expand a learner's knowledge of IT. In addition, certifications and careers in IT are introduced with explanations of each in this crucially important field.

Duration:
10 hours

Course Code:
IHRDC_BEES_1354

Content:

- Trace the evolution of information technology
- Explain the basics of computing
- Describe operating systems and how process and memory management, the kernel, and other OS concepts work together.
- Discuss a variety of programming concepts
- Explore different types of software
- Discuss software management, application security, and the role of server software
- Describe different network infrastructures, configurations, and physical components
- Explain the use of databases and Big Data
- Outline the fundamentals of information security
- Describe cloud computing, service categories, and deployment models
- Discuss mobile technologies, e-commerce concepts, and platforms
- Explore the major social media websites, Web 2.0, and virtual communities
- Explain the basics of information governance and information security governance

IT/CYBERSECURITY

CompTIA Security+® Exam Prep Course

Description:

The CompTIA Security+® Exam Prep Course prepares test-takers for the Security+ exam, as administered by CompTIA. The CompTIA certification is recognized worldwide and adheres to the strict standards of ISO/IEC 17024 and is approved by the US Department of Defense to meet directive 8140/8570.01-M requirements. The course contains a variety of content presentation methods to help teach the concepts and vocabulary, and ultimately, learners are given ample opportunity to assess their skills with a multiple choice practice exam.

Duration:
30 hours

Course Code:
IHRDC_BEES_1489

Content:

- Compare and contrast various types of cyberattacks
- Describe the installation and configuration of network devices
- Implement secure network concepts
- Evaluate secure cloud, virtualization, and embedded systems concepts
- Install and configure identity and access services
- Compare various access control models
- Explain risk management concepts
- Explain incident response procedures
- Evaluate disaster recovery and digital forensics concepts
- Compare and contrast the characteristics of different cryptography algorithms and public key infrastructure (PKI)

Asset Security

Description:

Companies must protect their assets. Just as locks go on the doors to protect physical assets, electronic and data assets must also be guarded. Asset security involves the full support of everyone in an organization, from corporate-level personnel down to front line employees. Various security controls will be described that help protect privacy, along with data leakage prevention (DLP). Although it is not necessary, having some foundation in IT concepts is helpful in taking this course.

The content in this course aligns with Domain Two in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1154

Content:

- Understand the role of asset security and discuss its key themes
- Discuss the information life cycle and explain how information and data are classified
- Compare the various titles and roles of those involved with information security within an organization
- Learn about data and information privacy and how to protect privacy
- Compare different data retention and destruction methods
- Explain several methods for countering data leakage

IT/CYBERSECURITY

Identity and Access Management

Description:

This course introduces students to the principles of access controls, beginning with the central modes of information security and continuing through various attacks and defenses. The course presents different kinds of authentication techniques, how they work, and how they are distinguished from each other. This course requires some basic understanding of IT concepts.

The content in this course aligns with Domain Five in the CISSP exam, offered by (ISC)2. However, the course can be taken as a stand-alone without the intention of sitting for the exam.

Duration:
5 hours

Course Code:
IHRDC_BEES_1160

Content:

- Understand the key principles and terminology of information access control
- Discuss different types of identification and authorization techniques
- Describe common access control models and mechanisms
- Identify common access control attacks and countermeasures

Compliance and Operational Security Scenarios

Description:

This course contains a discussion of the role of security governance and risk management in information security. It looks at the policies and standards that are needed to operate an effective information security function and to oversee good information security practices. This course also features a number of fictional scenarios based on compliance and operational security to allow you to practice the concepts learned in the material. This course requires some basic understanding of IT concepts.

Duration:
5 hours

Course Code:
IHRDC_BEES_1217

Content:

- Discuss the foundational concepts of security governance (the CIA triad) and understand the job of overseeing data security
- Describe the role of policies, procedures, standards, and guidelines in information security
- Understand the types of security controls that an organization can employ and the concept of defense in depth
- Discuss ethical, regulatory, and privacy issues as they relate to information security
- Discuss different management practices for overseeing an effective information security function
- Identify common information security risks and threats
- Describe the process for conducting a risk assessment
- Identify the purpose and components of a disaster recovery plan and business continuity
- Understand the role of auditing and testing in information security governance
- Identify common threats and vulnerabilities
- Provide appropriate guidance in response to real-world scenarios that highlight compliance and operational security problems

IT/CYBERSECURITY

Application, Data, and Host Security Scenarios

Description:

When you download an app, or access a database, you want to trust that the software engineer who developed the app had an eye toward security. This course covers the security of applications, data, and hosts in information systems. It provides a comprehensive examination of software development and change management. This course also features a number of fictional scenarios based on real-world application, data, and host security. Although not required, having some experience or working knowledge in IT concepts is helpful in taking this course.

Duration:
5 hours

Course Code:
IHRDC_BEES_1219

Content:

- Discuss the role of security in software development
- Explain the software development life cycle and compare its eight stages
- Understand what the operating system is and how it works
- Describe different application and operating environments
- Discuss the role of databases and the information security challenges they raise
- Understand the various vectors for attack
- Explain the objectives of Trusted Recovery and the concept of system hardening
- Recognize the need for physical security and the varying means of achieving it
- Apply security concepts to real-world scenarios highlighting the need for application, data, and host security

Access Control and Identity Management Scenarios

Description:

Access control is the restriction of access to a computer system. So how does a cybersecurity professional manage this access control? This course introduces the principles of access controls, beginning with the central modes of information security and continuing through various attacks and defenses. It provides an overview of Identity Management and the resources used on modern-day information systems, including Web and cloud-based ones. This course also features a number of fictional scenarios based on access control and identity management that professionals face in the real-world.

Duration:
5 hours

Course Code:
IHRDC_BEES_1220

Content:

- Identify the four types of information access controls
- Describe different identification methods and technologies
- Discuss different components of Authentication, Authorization and Accounting
- Describe common access control models and mechanisms
- Explain the technologies used in single-sign-on systems
- Identify common access control attacks and countermeasures
- Provide appropriate guidance in response to real-world scenarios describing Access Control and Identity management challenges

IT/CYBERSECURITY

Introduction to Cybersecurity

Description:

Globally, incidents of data breaches, identity thefts, and cybercrimes are on the rise, along with the explosive growth of online personal data and the expansion of computer networks. This course teaches the fundamental concepts of information security one will encounter in the cybersecurity field. This course will set the groundwork with basic vocabulary and then introduces concepts such as access controls, risk management, cyber attacks, and digital forensics. This course requires a basic understanding of IT concepts.

Duration:
5 hours

Course Code:
IHRDC_BEES_1293

Content:

- Describe fundamental information security concepts
- Discuss data breaches and hacker motivations
- Identify different types of information access controls
- Describe the importance of accountability and audits
- Explain the technologies used to provide identification and authentication
- Relate the role of risk and risk management in information technology
- Describe different methods of cryptography
- Define the elements of a business continuity and disaster recovery plan
- Identify common access control attacks and countermeasures
- Describe the steps involved in a digital forensics investigation

Security Awareness Training

Description:

This course teaches employees to identify and prevent security breaches before they happen. For four cents per day per employee, your staff will have year-long, anytime, anywhere access to our highly-rated online security awareness training. This comprehensive training spans the facets of security awareness from in-office to remote security, email to phishing attacks, malware to ransomware, cloud to social media, and more. In addition, the optional phishing simulation features the ability to simulate phishing attacks to test employee's ability to recognize and respond to attempted attacks.

Duration:
2 hours

Course Code:
IHRDC_BEES_1319

Content:

- Describe the realms of security awareness and how each intersects
- Explain how a physical location is secured and best practices for preventing a breach
- Identify steps that employees should take to ensure data and device safety when working remotely
- Relate the risks of utilizing Cloud services and the steps employees can take to secure Cloud-stored data
- Explain how access to sensitive information is granted to employees and the ways in which access control practices keep data safe
- Describe the best practices for using social media so that data and accounts are not compromised
- List the ways in which hackers can use social engineering to gain access to sensitive information and what to do if a social engineering attack is suspected
- Relate the aspects of mobile devices that put them at risk for a cyber attack and what an employee should do to secure the device as best as possible
- List the forms of network security in place, the risks to these security measures, and the employee's role in thwarting an attack
- Describe the correct steps to take when a breach of security occurs across any and every realm of security

LEADERSHIP

Introduction to Leadership

Description:

This course examines how to be a successful (that is, effective) leader. Based on D. Quinn Mills' book, Leadership: How to Lead, How to Live, a text used at Harvard Business School, this course asks the crucial questions about leadership in today's organizations: What is leadership and why is it important? What does effective leadership require? What is visionary leadership? What is the role of charisma? What is the difference between managing, administering, and leading?

Duration:
4 hours

Course Code:
IHRDC_BEES_312

Content:

- Course Outline
- What is Leadership?
- Leadership Definitions
- Levels of Leadership
- Leadership Roles
- Becoming a Successful Leader
- Hierarchy
- The Seven Bases for Leadership
- Commitment and Leadership
- Authority and Leadership
- Web Research: Leadership
- Leadership Skills

Body Language for Leaders

Description:

At the core of strong leadership is the ability to communicate effectively. But many leaders focus solely on their spoken words while ignoring the impact of their nonverbal cues, including facial expressions, hand gestures, body movements, and eye gaze. By understanding the impact of body language, leaders can learn how to communicate in a way that builds and sustains positive relationships with employees, clients, and business partners. This course will provide leaders with tips for reading body language and using it to exude both strength and warmth. The course also addresses gender stereotypes and cross-cultural body language and explores the role of body language in virtual communication.

Duration:
3 hours

Course Code:
IHRDC_BEES_1526

Content:

- Define leadership and identify the essential leadership skills
- Explain how body language impacts leadership
- Read basic body language cues
- Use body language to exude warmth and empathy
- Consider how to be an inclusive leader through active listening
- Demonstrate charisma through body language
- Use body language effectively when negotiating
- Explore ways to use body language to debunk gender stereotypes
- Identify body language norms across various cultures
- Consider how to improve cross-cultural competencies
- Manage body language during a video conference

LEADERSHIP

Leaders and Work-Life Balance

Description:

This course addresses the question of work-life balance, one which is of great importance to leaders in all settings. Based on D. Quinn Mills' book, Leadership: How to Lead, How to Live, a text used at Harvard Business School, this course looks at methods and techniques to reconcile work and family. You will also consider the question of personal fulfillment and the needs and demands of leadership.

Duration:
4 hours

Course Code:
IHRDC_BEES_37

Content:

- Assessing Attitudes Toward Work, Career and Life
- Writing Quickly
- Writing Quickly: Structure
- Revising Your Writing
- Revising: Jargon
- Email
- Additional Resources: Business Writing
- Self-Assessment

Leading and Managing Change

Description:

Whether adopting new technology or adapting to a drastic shift in an organization's core focus, managers play a fundamental role in effecting changes. Based on D. Quinn Mills' book, Leadership: How to Lead, How to Live, a text used at Harvard Business School, this course addresses the key issues managers face in a dynamic environment. By understanding the steps in effecting change and how to overcome resistance, a manager can successfully lead change at various levels of an organization.

Duration:
4 hours

Course Code:
IHRDC_BEES_38

Content:

- Forces for Change and Degrees of Change
- Mini-Case: The neonational Health Information Project
- Mini-Case: Saratoga Plastics
- Levers for Change
- Mini-Case: Intoroducing Open Source Software
- ADKAR Model for Change
- Min-Case: Center City Transit
- Managing Strategic Change
- Mini-Case: BestProducts

LEADERSHIP

Leading Teams

Description:

This course addresses the key issues surrounding leadership in a team. Why is it important? What does it require for a team leader to lead his team effectively? Based on D. Quinn Mills' book, Leadership: How to Lead, How to Live, a text used at Harvard Business School, this course considers how team leaders must account for the special and unique circumstances of working in a team, where responsibility, accountability, communication, and leadership are shared.

Duration:

4 hours

Course Code:

IHRDC_BEES_39

Content:

- Definitions: Teams and Empowerment
- Team and Team Leader Roles
- Team Motivation
- Team Leaders and Central Skills
- Team LeaderChecklist

LOGISTICS AND SUPPLY CHAIN OPERATIONS

Supply Chain Management Basics

Description:

As a supply chain grows in complexity, and companies increasingly source products and services from a more diverse and global set of suppliers, the job of managing the processes that ensure the steady and reliable flow of components and inputs has never been more difficult. This course introduces the core concepts and components of supply chain management, including supplier evaluation, logistics, inventory management, and other supply chain practices.

Duration:
10 hours

Course Code:
IHRDC_BEES_987

Content:

- Define supply chain management and understand its strategic role in organizations that source goods and services
- Explain the goals of effective supply chain management and procurement
- Analyze how organizations in a supply chain communicate and manage relationships
- Explain the supplier appraisal process and understand its role in supply chain management
- Formulate strategies for mitigating supply chain risk, and discuss the events that can create disruption in the supply chain
- Assess the major trends and issues shaping supply chain management today

Logistics and Distribution Management

Description:

This course explores the fundamental concepts and ideas of logistics and distribution management. It delves into the various logistics information management systems, analyzes their financial aspects and technological influences, and explains how to manage and measure their performance. This course is divided into modules that explain logistics management, inventory management, and warehousing and distribution. Throughout these modules, course participants will review and distinguish between inbound logistics, outbound logistics, reverse logistics, and third-party logistics; explore the tools and techniques for tracking and valuing inventory, including ABC analysis; and learn the functions of packaging and methods for transporting goods through simple and complex distribution channels.

Duration:
6 hours

Course Code:
IHRDC_BEES_1206

Content:

- Understand and analyze the various logistic information management systems.
- Explain how to manage and measure logistics performance
- Define inventory and understand how to track and value inventory
- Demonstrate how to classify inventory using ABC analysis
- Explain the layout and operations of a warehouse or distribution center
- Understand the functions of packaging, the various modes of transportation, and both simple and complex distribution channels

LOGISTICS AND SUPPLY CHAIN OPERATIONS

Procurement and Supply Management

Description:

This course explains the evolution from the transactional purchasing or procurement function into the strategic process of supply management. It introduces key concepts and ideas that can be used to successfully source and manage suppliers and to deal with issues that may arise across the supply chain. The course is divided into modules that explain supply management basics; describe strategic, ethical, and sustainable sourcing; and discuss supply chain leadership and integration. Course participants will explore supply management from several viewpoints; align sourcing, communication, and management strategies; and incorporate ethical and sustainable practices into the supply chain. Trends and changes to the profession due to the Internet and emerging technologies are also discussed.

Duration:

8 hours

Course Code:

IHRDC_BEES_1209

Content:

- Discuss the importance of internal and external relationships in managing suppliers and developing a sourcing strategy
- Articulate ways to enhance communication across the supply chain
- Manage and continuously improve supplier performance
- Determine the effects of e-procurement on supply management
- Identify and manage supply risk, measure performance, and overcome organizational barriers to supply chain excellence
- Understand the need for leadership and diversity within the supply chain

Operations Management

Description:

This course explores the fundamental concepts and theories practitioners will need to successfully guide operations in manufacturing and service organizations. Modules in this self-paced course introduce key foundational material, describe the interplay of supply chains and demand management, and explain the role that processes and process management play in robust operations. Specific tools, techniques, and methodologies (including Lean, total quality management, and Six Sigma) are presented to show their applicability to operational strategies.

Interactive and integrative exercises throughout the course challenge learners, ensuring that they understand important ideas, schemes, and information. Educational review materials and study aides assist in the retention of material, and video segments from industry professionals provide real-world advice that students can use to help reach operational goals and objectives in professional settings.

Duration:

10 hours

Course Code:

IHRDC_BEES_1204

Content:

- Identify the important fundamental aspects of operations management
- Classify the integration and location factors that contribute to successful operations
- Demonstrate the part that demand chains play in a productive operations strategy
- Analyze the importance of forecasting, aggregate planning, and master production scheduling
- Devise effective process management strategies that can be combined with strategic and tactical plans
- Summarize how alternative management methodologies can be used to augment operations management programs

MANAGEMENT

Business Ethics in the 21st Century

Description:

This course deals with business ethics, the consideration of questions of moral right versus wrong in the context of business practice. Individual business leaders are increasingly being held responsible and accountable for their ethical behavior. Organizations have learned that the costs of unethical actions can be high, both legally, and from the perspective of brand image and reputation. This course reviews how organizations can establish and encourage an ethical culture while monitoring for compliance.

Duration:
1 hour

Course Code:
IHRDC_BEES_564

Content:

- Describe the major ethical frameworks used in developing business ethics
- Explain the three components of the Ethical Triangle: Individual Ethics, Leadership Ethics, and Governance and Control
- Discuss key ethical challenges in the workplace
- Describe the use of organizational ethics codes
- Outline the ethical issues involved in the employer-employee relationship including Employment at Will, due process and fairness
- Discuss the use of ethics training
- Explain how organizations monitor ethical performance
- Describe the relationship between Corporate Social Responsibility (CSR) and ethics
- Outline issues involving corporate governance
- Explain how sustainability is an ethical concern
- Discuss ethics and the regulatory environment (Sarbanes-Oxley Act; U.S. Foreign Corrupt Practices Act)
- Explain the issues around whistleblowing
- Describe the role of leadership in establishing an ethical culture

Handling Difficult Employee Behavior

Description:

This course is designed to prepare managers to deal with troublesome and difficult behavior by employees. By effectively addressing, coaching, and counseling employees, you can improve their behavior and improve morale, staff retention, productivity, and teamwork. This course uses videos to illustrate each behavior type so that you can more easily apply the techniques to your current work environment. Focusing on dealing with the behavior (not the person), tools and techniques for positive change are clear and well-defined.

Duration:
1 hour

Course Code:
IHRDC_BEES_583

Content:

- Discuss the importance of addressing difficult employee behavior
- Describe a six-step model for handling conversations about difficult behaviors
- Apply practical tips for handling conversations about difficult behaviors
- Recognize the common 12 difficult employee behavioral types: the Complainer, the Disorganized Employee, the Procrastinator, the Inflexible Employee, the Unmotivated Employee, the Overly Sensitive Employee, the Overly Confident Employee, the Manipulator, the Social Skills Challenged Employee, the Overly Social Employee, the Needy Employee, the Bully
- Describe the 12 difficult behaviors, their causes and motivations, and their consequences
- Outline best practices for handling the 12 difficult behaviors
- Apply best practices to workplace scenarios involving the 12 behavioral types

MANAGEMENT

Managing in a Modern Organization

Description:

This course considers the fundamentals of management and how managers can be effective in organizational settings. Based on D. Quinn Mills' book, Principles of Management, a text used at Harvard Business School, this course addresses managing in the modern organization.

Duration:

4 hours

Course Code:

IHRDC_BEES_320

Content:

- Leadership and Management
- Attitudes Toward Hierarchy
- Video: The Five Key Managerial Activities
- Web Research: Management Resources
- Three Management Types
- Case: Atlas Manufacturing
- Managerial Tips from Google
- Your Management Approach

Negotiations: Making Business Deals

Description:

This course is designed to help executives and other potential deal-makers learn the essential strategies and skills to conducting successful business negotiations. Learners in this course will explore the fundamentals of deal making with the help of games, videos, interactive exercises, case studies, and other engaging content. The course begins by comparing and contrasting the two major types of negotiation-Dispute Settlement Negotiation (DSN) and Deal Making Negotiation (DMN)-and exploring the difference between negotiation and bargaining. Key topics covered in the course include the stages of the negotiation process; the importance of preparation and realistic goal-setting; the five basic approaches to negotiation; when to make (and when to avoid) commitments; the relative importance of relationships and outcomes; the decision to walk away from a negotiation; and the unique challenges posed by multiparty, international, and cross-cultural negotiations.

Duration:
4 hours

Course Code:
IHRDC_BEES_1511

Content:

- Distinguish between Dispute Settlement Negotiation (DSN) and Deal Making Negotiation (DMN)
- Explain the importance of BATNA in Deal Making Negotiation
- Describe the relationship between bargaining and negotiation
- Distinguish between interests and positions, and describe the importance of each
- Explain the five steps of the negotiation process
- Identify the types of information that should be assembled prior to negotiation
- Describe the five principal approaches to negotiation
- Identify the two types of commitments, and explain how they affect negotiating flexibility
- Explain the importance of the opening position
- Describe Leigh Thompson's mental models of negotiation
- Explain the importance of active listening in the context of Deal Making Negotiation
- Identify the challenges posed by multiparty negotiations, and describe strategies for meeting those challenges
- Describe the circumstances under which a negotiator should call for a timeout, and when she should walk away from a negotiation
- Explain the additional preparations needed before undertaking international or cross-cultural negotiations
- Apply the principles of Deal Making Negotiation to real-world examples

Handling Workplace Conflict

Description:

As a manager, you will undoubtedly deal with conflict. And as you look around to figure out who will keep the peace, you might be realizing that person is now you. This course introduces the various forms of conflict that can arise in the workplace and presents strategies that managers can use to help deal with conflict situations. It includes video commentary from an expert in the field and presents some fictitious real-world scenarios that allow learners to practice applying the skills and strategies discussed throughout the course.

Duration:
6 hours

Course Code:
IHRDC_BEES_1067

Content:

- Identify the different types of conflict in the workplace
- Describe some of the major causes of workplace conflict
- Discuss the Thomas-Kilman model of conflict
- Consider your personal conflict style and compare it to other styles
- Identify various conflict behaviors in the workplace
- Explore conflict resolution strategies
- Discuss best practices for handling difficult employees
- Describe what constitutes dangerous conflict and consider methods for handling risky situations

MANAGEMENT

A Manager's Guide to Superior Customer Service

Description:

A Manager's Guide to Superior Customer Service explores the art and science of developing a superior customer experience. Customers are vital to any organization and superior customer service can pay large financial dividends.

Duration:
3 hours

Course Code:
IHRDC_BEES_1355

Content:

- Explain the concept of the comprehensive customer experience
- Discuss the case for offering superior customer service
- Describe the customer service philosophies of leading companies including Apple, Nordstrom, L.L. Bean, and others
- Discuss the concept of performance measurements and Key Performance Indicators (KPIs)
- Describe the use of the Net Promoter Score (NPS)
- Discuss the Voice of the Customer (VoC) process
- Outline ways to build customer loyalty
- Explain how to calculate Customer Lifetime Value (CLV)
- Discuss the issues involved in managing customer service
- Describe how to establish customer service expectations
- Discuss the approach to providing customer service on different platforms (in-person, over the phone, online)
- Explain approaches for handling difficult customers

Quality Management Basics

Description:

Quality Management Basics provides a firm foundation for anyone looking to understand quality management practices and techniques. The course combines instructional material with interactive exercises, vocabulary games, and flashcards to explain the core concepts and strategies of effective quality management. Case studies and examples from manufacturing and service sectors help to explain the nuances of quality concepts, while video segments from experienced quality management professionals provide expert insight into the real-world application of quality principles. The course is self-paced to allow students as much time as needed to absorb information and to understand the key concepts that will help them satisfy their stakeholders and delight their customers.

Duration:
12 hours

Course Code:
IHRDC_BEES_634

Content:

- Describe the principles and practices that guide quality management activities
- Understand how specific tools and techniques can be used to monitor and control quality
- Use these tools in combination to create powerful plans and solutions to quality problems
- Leverage quantitative and qualitative data to measure and control work
- Describe the core competencies involved in several popular quality management methodologies
- Employ quality analysis and quality planning approaches to meet customer expectations

MANAGEMENT

The Effective Manager's Toolbox

Description:

There are a number of managerial factors that are vital in managing and leading. Becoming a better manager or leader is directly connected to how well you can master them. The Effective Manager's Toolbox is a suite of online modules designed to give managers a head start on managing issues correctly and professionally with less stress and fewer negative organizational circumstances. The modules offer learners an explanation of the managerial mindset that all managers and leaders must adopt to succeed. After careful consideration of the relevant and reference managerial and leadership factors, including such topics as dealing with direct reports, solving problems, planning and budgeting, handling conflict, and others, learners are given a series of video-based scenarios and asked to consider how they would handle the challenges presented for the most optimal results. Upon completion, learners are given a summary of what they've learned for quick reference while at work.

Duration:
15 hours

Course Code:
IHRDC_BEES_1529

Content:

- Inhabit the managerial mindset
- Understand what employees want from their jobs
- Understand how managers lead
- Recognize the components of a manager's job including enforcing policies and procedures, controlling expenses, dealing with subordinates and superiors, planning and budgeting, recruiting and developing talent, and solving problems
- Implement the qualities that make an effective leader
- Address real-world managerial problems in customer service, cost budgeting, cost cutting, and vendor relations

MANAGEMENT

Managing People

Description:

To be successful and move ahead in his or her career, a manager must understand how to manage people, including motivating workers and coordinating their activities. This course will explain how the goals, empowerment, measurement system of management can be employed and how organization structures differ. The course will also cover the difficulty of discipline while trying to maintain momentum.

Duration:
4 hours

Course Code:
IHRDC_BEES_321

Content:

- Fundamentals
- The Managerial Mindset
- Attitudes Toward Empowerment
- What Do Employees Want
- Managing Down, Managing Up
- Case: Customer Service at New Vista Bank
- Organizational Structure
- Motivation
- Case: Mechanica
- Empowered Teams

Time Management

Description:

One of the more precious resources a manager has is his or her time. Managers can become more effective by employing time management and scheduling techniques, delegating, outsourcing key tasks, and employing technology. Effective time management helps managers achieve their goals.

Duration:
4 hours

Course Code:
IHRDC_BEES_46

Content:

- Introduction to Time Management
- Your Attitudes towards Time and Time Management
- Tools: Time and Activity Logs
- Procrastination
- Goal Setting
- Finding Personal Fulfillment
- The Key to Time Management
- Tools: Task Lists (To-do lists)
- Tools: Action plans
- Tools: Delegation
- Tools: Managing email, phone, and other interruptions
- Tools: Planning effective meetings
- Exercise: Managing Your Inbox

MANAGEMENT

How to Coach

Description:

Managers who lead and manage through coaching-providing encouragement, feedback, and support-are more successful in "working through others." This brief course focuses on the skills and techniques of positive coaching in an organizational setting including listening actively, providing constructive feedback based on observation, reinforcing positive employee performance through recognition and praise, and teaching new skills.

Duration:

4 hours

Course Code:

IHRDC_BEES_43

Content:

- Types of Coaching and Coaching Triggers
- The Coaching Process
- Determinging Coachability
- Step 1: Challenges.Opportunities Identification
- Step 2: Active listening
- Step 3: Planning and Goal Setting
- Step 4: Active Coaching and Feedback
- The USED Model of Coaching
- The GROW Model
- Monitoring and Follow-up
- Mentoring and Career Development

MARKETING

An Overview of Marketing

Description:

This course provides an introduction to marketing and marketing planning, and addressing the definition of marketing, the marketing mix (the Four Ps), the strategic importance of marketing, and customer values and satisfaction.

Duration:

4 hours

Course Code:

IHRDC_BEES_360

Content:

- What is Marketing?
- The Marketing Process
- The Marketing Mix and the Four Ps
- Marketing and Strategy
- Customet Value, Customer Satisfaction, and Loyalty
- Marketing Ethics

Social Media Marketing

Description:

Using social media in marketing is practically a requirement in today's highly connected digital world. But it can be confusing and complex to dive into social media marketing without some foundation in the basics. This course focuses on teaching the principles, best practices, and strategies for incorporating social media into a marketing plan. The first module teaches the various ways that social media can be used for marketing, including defining a clear brand voice, improving reputation, and engaging with customers. The course then looks at the practical way marketers can incorporate social media activities into a focused marketing plan. Learners identify how to integrate their social media with mobile, a hub website, and email marketing. They also learn how to use strategic metrics for tracking success.

Duration:

3.5 hours

Course Code:

IHRDC_BEES_1205

Content:

- Define social media, name several platforms, and explain the benefits and drawbacks of using each platform
- Create a content marketing plan that addresses audience, tone, relevance, frequency, and quality of content
- List the spheres of reputation according to the Harris Poll and explain how social media can be used to manage each sphere of an organization's reputation
- Describe why and how a company should monitor social media
- Explain various strategies for engaging with audiences via social media, and the aims of each form of engagement
- Set social media marketing objectives that correlate to specific sales and growth goals
- Describe how to integrate social media with mobile, email, and a hub website, and describe the advantages of doing so
- Demonstrate the difference between organic and paid reach, and list the factors that influence reach on various social media platforms
- Explain how to reach influencers and name at least two relevant influencers in the learner's industry
- Quantify the time and human capital that will be devoted to the learner's social media marketing campaign based on his or her organization's size

MARKETING

Web Analytics

Description:

This course is designed to help learners develop a solid understanding of the basic concepts and techniques that they will encounter as practitioners in the web analytics field. Learners in this course will expand their knowledge through games, videos, case studies, quizzes, and other engaging content. Topics of major concern that are discussed in Module 1 include a summary of web analytics concepts and important terms, along with the organizations and personnel who use web analytics. The course defines key performance indicators and discusses how they are chosen and implemented. A discussion of segmentation follows, with strategies for how to categorize website visitors. Students will also learn how to plan and assess website business strategies using web analytics. In Module 2, learners will explore reporting and dashboards as they relate to web analytics. Students will gain an understanding of how to plan for and design dashboards and how qualitative research offers deeper business insights. In addition, students will learn how to conduct split and multivariate testing, and implement web analytics best practices.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1429

Content:

- Define web analytics
- Define key terms used in web analytics
- Explain how web analytics evolved
- Discuss how different organizations use web analytics
- Identify who uses web analytics in an organization
- Explain the difference between search engine optimization (SEO) and search engine marketing (SEM)
- Describe the difference between metrics and KPIs
- Describe what segmentation is and how it can improve the usability of a website
- Describe what dashboards are and why they are useful
- Identify what should go into a dashboard
- Define the difference between implicit and explicit data
- Explain the use of dynamic content
- Describe landing page optimization best practices
- Articulate the importance of experimentation and testing in web analytics
- Explain the differences between A/B and multivariate testing
- Identify where a visitor is in the buying cycle and purchase funnel
- Define common e-commerce metrics
- Describe how surveys and qualitative information is used in web analytics
- Identify when it is appropriate to include developers and page tagging

Paid Search (PPC)

Description:

Paid Search advertising, also called pay-per-click (PPC), is used to pay for traffic to visit a website. In this course, learners will explore search marketing, the search process, and the buying cycle. Also included is how to set up a successful PPC account, how to set and measure goals, and how to optimize keyword usage using a variety of strategies. Learners will then examine components of effective ads and landing pages, how to optimize ad targeting, and when to use search or display advertising. The course then delves into research and analysis considerations, such as report creation, improving quality score, and using A/B and multivariate ad testing. Course material is presented through the use of text, videos, games, and other engaging content.

Duration:
4 hours

Course Code:
IHRDC_BEES_1433

Content:

- Explain the purpose of paid search (pay-per-click) advertising
- Define search marketing, search engine marketing (SEM), and search engine optimization (SEO)
- Describe the search process and the search buying cycle
- Demonstrate how to set PPC account goals and measure them
- Explain how to build a PPC account and estimate conversion rates
- Understand and set bids

Paid Search (PPC)

- Conduct an audit of a PPC account
- Describe different types of keyword searches
- Explain how to use keyword planners and other tools
- Describe how to use keyword matching and negative keywords
- Describe the benefits of paid search (pay-per-click) and the parts of an ad
- Explain how dynamic keywords and different ad extensions are beneficial
- Relate how a marketer can segment B2B and B2C searchers
- Describe the difference between mobile and desktop ads and landing pages
- Explain how to optimize a landing page
- Understand the difference between search and display advertising
- Describe display ad formats and the importance of contextual advertising
- Identify components of an effective paid search report
- Describe the pros and cons of A/B versus multivariate testing
- Explain how to manage the PPC channel and why editors are useful

MARKETING

Mobile Marketing

Description:

In the age of smartphones, it is a foregone conclusion that marketing efforts should be accessible on a mobile device. This course offers an introduction to mobile marketing, looking at strategies for reaching target audiences through multiple channels, including websites, email, social media, and mobile apps. With an emphasis on key concepts, definitions, and metrics, the course explores ways that marketers can leverage the unique benefits of mobile devices to drive profitable customer action.

Duration:
3 hours

Course Code:
IHRDC_BEES_1472

Content:

- Define mobile marketing and explain its benefits
- Identify the major types of mobile devices and describe how they are used
- Explain the differences among the marketing efforts of large, medium-sized, and small businesses
- Consider the purposes of mobile marketing regulations
- Examine the key policies, guidelines, and/or organizations in the mobile marketing industry
- Identify various methods for locating mobile users
- Distinguish mobile-dedicated websites from responsive design websites
- Describe the various types of mobile advertisements
- Explain how loyalty programs and mobile coupons can enhance mobile marketing efforts
- Discuss the benefits of location-based services
- Consider how to choose the right mix of mobile marketing channels
- Define key metric categories and explain the use of channel-specific metrics

Marketing Automation

Description:

This course is designed to help learners develop a solid understanding of the basic concepts and techniques that they will encounter as practitioners in the marketing automation field. Learners in this course will expand their knowledge through games, videos, a case study, quizzes, and other engaging content. Topics of major concern that are discussed in Module 1 include the key concepts, terms, and techniques used in marketing automation. The buying cycle and purchase funnel are described in detail, along with measuring content strategies and calculating the value of customers, followers, likes, and mobile loyalists. In Module 2, the single customer view is introduced as it relates to cultivating leads. The module then covers customer relationship management and email marketing, with emphasis on multi-touch campaigns and lead scoring. Loyalty programs are discussed and methods for measuring their effectiveness. Finally, learners will combine this knowledge with business concepts in order to better inform marketing decisions for their firm.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1231

Content:

Marketing Automation

- Define marketing automation and explain its value
- Define key terms used in marketing automation
- Explain the key components of marketing automation
- Define the buying cycle and the online marketing funnel
- Explain the aspects of prospect intent in a buying cycle (AIDA)
- Identify the key considerations in developing a content strategy
- Name the major marketing channels
- Define and explain what customer value is
- Define and discuss the advantages of a single customer view
- Describe the functions of a CRM system and an email marketing system
- Discuss the types of data that are useful in lead capture
- Explain the use of dynamic content
- Explain the use of explicit and implicit data in lead nurturing
- Articulate the value of lead scoring
- Define strategies for building customer loyalty
- Describe different methods of marketing automation measurement and control

MARKETING

Content Marketing

Description:

This course offers an introduction to content marketing, a strategic marketing approach focused on creating and distributing valuable, relevant, and consistent content to attract and retain a clearly-defined audience. With an emphasis on key concepts, definitions, and metrics, the course examines ways that marketers can tailor their content to meet the specific needs of potential customers as they travel through the sales funnel. Learners will explore how content is used to build brand awareness and establish the brand as a trusted source of expert advice.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1425

Content:

- Define content marketing, and explain how it relates to social media and SEO
- List the major types of content used in content marketing, and explain the strengths of each
- Explain the purpose and goals of a content marketing plan
- Describe the online marketing funnel, and explain which types of content are appropriate for which stages of the funnel
- Articulate the advantages of audience targeting and audience segmentation
- Explain the role of influencers in content marketing
- Describe the process of channel management, and explain why it is important to furthering your marketing goals
- Articulate the unique importance of video to content marketing campaigns
- Explain the importance of measuring your campaign's effectiveness, and list the major performance metrics
- Explain the advantages of repurposing content
- Define a content audit, and explain its importance in content marketing

Conversion Rate Optimization

Description:

Conversion Rate Optimization is the process of steady and incremental marketing improvement to yield stronger results. In this course, learners will discover the five key steps to Conversion Rate Optimization and how the process interacts with other facets of digital marketing. Through a variety of instructive techniques, including subject matter expert videos and case-study scenarios, this course provides learners with the knowledge and resources to be more effective professionals.

Duration:
3 hours

Course Code:
IHRDC_BEES_1443

Content:

- Define conversion rate and the many factors that contribute to it
- Identify the components of a digital marketing campaign and the role each component plays in conversion rate optimization
- Identify strategies for enhancing conversion rates
- Demonstrate successful application of the concepts learned to real-world scenarios

MARKETING

Digital Marketing Strategy

Description:

As consumers increasingly turn to the digital marketplace of the Internet, organizations recognize that they can better reach and connect with their customers, clients, or prospects through digital marketing.There are many benefits to effective digital marketing including improved brand perception, more efficient lead generation, and better customer satisfaction levels. That can translate into the sale of more products and services. Creating a digital marketing strategy is crucial to meeting the marketing goals of the organization. This course offers a step-by-step introduction to the process of creating such a strategy, with an emphasis on key concepts, definitions, and metrics.

Duration:
3 hours

Course Code:
IHRDC_BEES_1492

Content:

- Explain the importance of creating a digital marketing strategy in meeting organizational marketing goals
- Discuss the differences between an integrated and non-integrated digital marketing strategy
- Describe the five stages of a digital marketing strategy (Research, Plan, Execute, Measure, Analyze and Adjust)
- Explain how digital marketing elements can address strategic needs
- Describe the customer journey and how it applies to digital marketing
- Explore the use of a digital SWOT in assessing marketing efforts
- Explain the use of SMART goals in the planning stage
- Describe the use of the Plan, Do, Check, Act model in digital marketing
- Explain how lessons learned are integrated into digital marketing
- Describe the key ethical and legal issues in digital marketing
- Discuss best practices in fashioning a digital marketing strategy

Search Engine Optimization

Description:

Search Engine Optimization (SEO) encompasses the practices and metrics of trying to increase a web site's ranking with search engines. This course will engage learners through a variety of assignments that span the history and technology of the World Wide Web. Students will learn how to leverage both content and technical features in order to increase ranking while also learning about the latest tools to measure performance. These aspects are then incorporated into real-world scenarios that challenge students to apply what they have learned.

Duration:
3 hours

Course Code:
IHRDC_BEES_1428

Content:

- Address SEO as a business process, identifying how it fits within traditional communications and marketing roles
- Define the components of a web page and how each contributes to search engine rankings
- Describe how search engines find and rank web site content
- Identify strategies for enhancing search engine ranking
- Demonstrate successful application of the concepts learned to real-world scenarios

ONLINE LEARNING

Narrative Learning

Description:

Storytelling and the use of narrative case studies can be a highly effective way to teach. Often, we learn best by doing, and in the context of online learning, ""doing"" often means utilizing case study and role-playing methods. This course introduces the major techniques and strategies for integrating narrative learning into an educational curriculum. It presents different types of narrative learning and identifies the best means to utilize each. Finally, it explores the efficacy of narrative learning and how it can be applied to online design and instruction. This course was developed by MindEdge's National Institute of Online Learning (NIOL), which was founded in 2012 with the goal to improve the quality and effectiveness of online learning, especially for adult learners, by promoting best practices and innovation in the field.

Duration:
5 hours

Course Code:
IHRDC_BEES_872

Content:

- Define narrative learning and summarize its core principles
- Identify various types of narrative activities and compare their applications
- Outline the stages of the narrative arc, specifying the purpose of each stage in terms of a story and a narrative activity
- Discuss best practices for narrative learning
- Design a scenario, case study, and simulation
- Interpret the literature surrounding the efficacy of narrative learning
- Critique poorly constructed narrative activities

Online Learning Accessibility

Description:

In developing any online learning material, federal regulations require adherence to specific accessibility standards. Students with disabilities must be given equal access to learn the content. This can be a major road block to an organization trying to develop online coursework. This course covers the basics of online learning accessibility standards and reviews best practices for accessibility. This course was developed by MindEdge's National Institute of Online Learning (NIOL), which was founded in 2012 with the goal to improve the quality and effectiveness of online learning, especially for adult learners, by promoting best practices and innovation in the field.

Duration:
2 hours

Course Code:
IHRDC_BEES_920

Content:

- Define online learning accessibility and summarize its core components
- Discuss the online learning accessibility level of your organization's learning content
- Define key terms in accessibility
- Explain WCAG and ISO accessibility standards
- Discuss federal accessibility requirements
- Outline key methods to make online learning accessible
- Discuss best practices for online learning accessibility

ONLINE LEARNING

Introduction to Online Learning

Description:

This course introduces the major models, tools, and techniques for creating and delivering online learning. It reviews the fundamentals of general learning theory and how it can be applied in practice to online design and instruction.

Duration:
2 hours

Course Code:
IHRDC_BEES_730

Content:

- Describe key trends in online learning.
- Differentiate between the constructivist and transmission models of learning.
- Devise techniques for active learning.
- Identify the steps common to course development processes and their roles in creating effective learning.
- Explain how learning objectives may be used to ensure that a course is meeting the need it was designed for.
- Identify the condition, performance, and qualification components of measurable learning objectives.
- Describe Bloom's Taxonomy and explain its application in instructional design.
- Describe the use of blended learning.
- Explain the benefits of narrative, adaptive, peer, and social learning.
- Discuss the instructional design needs specific to adult learners.
- Describe how to employ Whole-Part-Whole learning techniques.
- Recognize how worked examples advance learning.
- Describe instructional scaffolding and explain its use.
- Explain the 5E Learning Model.
- Explore the need for variety in online learning.
- Identify ways to incorporate video in online learning.
- Describe how to measure for success in online learning.

Teaching Online

Description:

This course offers a brief survey of the major models, tools, and techniques in teaching online.

Duration:
2 hours

Course Code:
IHRDC_BEES_734

Content:

- Discuss some of the benefits of online learning for students and instructors
- Describe differences between online and face-to-face classroom teaching
- Explain the role of an online instructor
- Assess your own practices as an online instructor
- Discuss effective ways to lead online discussion
- Describe the Flipped Classroom and blended learning models
- Outline ways to introduce collaborative learning (discussion forums, videoconferencing, Question of the Day, group projects, etc.) into an online program
- Discuss key challenges in online learning and how to handle them
- Describe methods for evaluating and assessing online instruction
- Apply your understanding to case studies

ONLINE LEARNING

The Technology of Online Learning

Description:

This course offers a brief survey of the technology employed in online learning. It reviews the key software and hardware options available, and it covers best practices in using technology.

Duration:

2 hours

Course Code:

IHRDC_BEES_748

Content:

- Discuss the significance of technology in enabling online learning.
- Define basic information technology (IT) terms and concepts as they apply to creating, delivering, and hosting online learning.
- Explain how a learning management system (LMS) functions and how it enables online learning.
- Describe key software tools (HTML, JavaScript, jQuery) employed in online learning.
- Outline the key issues (bandwidth, browser and plug-in compatibility, etc.) involved in delivering online learning over the Internet.
- Discuss the use of video in online learning.
- Explore the key technology issues in developing and delivering online learning to mobile devices (m-learning).
- Explain the methods used for integrating online learning into learning platforms, including SCORM, LTI, and Tin Can API.
- Describe the common IT challenges involved in online learning.
- Outline key questions about technology and online learning that organizations should ask.

PROJECT MANAGEMENT

CAPM® Exam Prep Course

Description:

This completely online and self-paced project management program builds successful project managers at all levels of the organization. It provides a comprehensive preparation for the Certified Associate in Project Management (CAPM)® certification exam including exam-taking tips, 25 comprehensive module quizzes, and two full-length, 150-question practice exams covering the areas of interest from A Guide to the Project Management Body of Knowledge, (PMBOK® Guide), which will provide a report to help you determine your areas of weakness.

Duration:
23 hours

Course Code:
IHRDC_BEES_1465

Content:

- Recognize how enterprise environmental factors and organizational process assets affect how projects can be managed
- Explain the five stages of a project life cycle and illustrate how these stages can overlap in time
- Demonstrate how to create a project management plan with subsidiary plans for each of the knowledge areas and explain how progressive elaboration and integrated change management can keep these documents effective and relevant
- Explain the overlapping nature of project activities and practice Project Integration Management to coordinate the various project management processes
- Illustrate how a project's various baselines (including scope, cost, schedule, quality, risk, procurement, and others) are determined, planned for, and managed
- Recognize how to effectively manage human resources and communicate with all stakeholders
- Explain the key methods used to estimate project schedule and cost at the beginning of a project and to forecast cost and schedule variances at any time during the project
- Identify key project stakeholders and continuously engage them in appropriate project activities
- Describe how the project management knowledge contained in the PMBOK® Guide can be used in practice

Project Management for Information Technology

Description:

Project management refers to the art, or science, of directing projects. This course, Project Management for Information Technology, focuses more specifically on how project management concepts can be applied to IT projects, as well as on project management issues that are unique to IT projects. It reviews the concepts, methodologies, and tools of project management as it relates to IT. Students will also learn about fundamentals, such as integration management, scope, costing, quality, human resources, risk management, and procurement. This course contains eight comprehensive module quizzes and a 70-question final assessment spanning IT project management areas of knowledge.

Duration:
25 hours

Course Code:
IHRDC_BEES_251

Content:

- Discuss the importance of internal and external relationships in managing suppliers and developing a sourcing strategy
- Articulate ways to enhance communication across the supply chain
- Manage and continuously improve supplier performance
- Determine the effects of e-procurement on supply management
- Identify and manage supply risk, measure performance, and overcome organizational barriers to supply chain excellence
- Understand the need for leadership and diversity within the supply chain
- Apply concepts from A Guide to the Project Management Body of Knowledge (PMBOK® Guide), to IT projects
- Explain the technical processes that might be applied during the IT project life cycle
- Describe the importance of scope control for IT projects and different tools that can be used to manage project scope
- Explain the challenges associated with delivering IT projects on time
- Differentiate between different techniques for managing the project schedule
- Discuss why cost management is difficult for IT projects and describe cost estimation methods, Earned Value Management, and portfolio management
- Explain several maturity models and how they can be applied to improve IT project quality
- Explain various approaches for team building and communicating on IT projects
- Discuss different sources of IT project risk and how to manage them

- Describe issues related to IT project procurement, such as outsourcing decisions, e-procurement, and others

PROJECT MANAGEMENT

Project Management Team Leadership

Description:

The vast majority of project work in today's organizations is done in a team setting. In this environment, project management team leaders have a tremendous responsibility and opportunity to develop and exhibit leadership skills. This course first discusses the roles and responsibilities of the project management team leader, in particular, their responsibility with regard to project stakeholders. Next, the course discusses how project management team leaders can build a positive team environment through effective communication, team building activities, and reflective listening. Lastly, the course covers problem-solving within the team. Project management team leaders must be effective in identifying and resolving team problems in order for the project to succeed. To do this, team leaders must have an understanding of the team dynamic for decision-making and must be able to manage conflict among personality differences and barriers.

Duration:
18 hours

Course Code:
IHRDC_BEES_1435

Content:

- Define a team and identify six common types of teams
- Explain Bruce Tuckman's model of group development
- Describe how the project life cycle is relevant to team issues
- List the three sources of power for project management team leaders
- Describe ways to manage stakeholder expectations
- Explain different types of team building activities
- Define reflective listening
- Identify the challenges of virtual teams and how they relate to the project management team leader's roles
- Compare and contrast voting and consensus as methods for decision-making
- More effectively identify and resolve team problems
- Explain the different characteristics of effective and open team communication
- Identify the best practices for using e-mail and telephone among team members
- Identify several common team problems and apply methods for resolving these issues

Principles of Scrum

Description:

This course outlines the fundamental theories and principles of Scrum frameworks, including the underlying philosophy and essential tools practitioners need to adapt to an Agile way of working. Implemented properly, these techniques can produce extraordinary results for stakeholders and customers. Information in this course is presented in a simple, easy-to-understand format and augmented by interactive games and exercises to improve learner understanding and retention. Case studies and video segments from experienced Scrum professionals provide real-world tips and guidance to bolster learner comprehension and expand knowledge at practical and applicable levels.

Duration:
10 hours

Course Code:
IHRDC_BEES_1488

Content:

- Define essential Scrum terms and identify the interdependent nature of key concepts
- Summarize the specific, distinct roles that practitioners assume in effective Scrum frameworks
- Identify the stages of the Scrum cycle and demonstrate how these stages combine to meet evolving customer needs and requirements
- Compare and contrast the three primary Scrum artifacts and detail how they integrate to ensure a common understanding of project expectations
- Explore several tools and techniques that help project participants meet and exceed customer needs and wants

PROJECT MANAGEMENT

PgMP® Exam Prep Course

Description:

This course provides a comprehensive preparation for the Program Management Professional (PgMP)® certification exam including exam-taking tips, comprehensive module quizzes, and over 200 practice questions covering the areas of knowledge as described in PMI's Program Management Professional Exam Content Specification.

Duration:
25 hours

Course Code:
IHRDC_BEES_1494

Content:

- Explain the overlapping nature of program activities, interdependencies, and the five Program Management Performance Domains
- Prepare effectively to pass the PMI-PgMP Exam
- Illustrate how organizational strategic objectives are related to program management and benefits delivery
- Explain how benefits are transferred and sustained effectively
- Recognize how to effectively manage resources and communicate with all stakeholders
- Identify key project stakeholders and continuously engage them in appropriate program activities
- Explain the stages of the program life cycle
- Recognize the goal of governance in program management
- Recognize best practices in risk management

PM Primer- Conflict Resolution

Description:

This online course focuses on how project managers can resolve conflicts in a project setting. Any time you convene a group of people to work together as closely as project teams do, conflicts are bound to happen. Project team members will likely have different views, personalities, and work styles that may clash as project objectives and goals are pursued. To ensure that projects achieve their goals and project teams reach their full potential, conflicts must be carefully managed and effectively resolved by skilled practitioners and key stakeholders. Project managers and team leaders must recognize the triggers that signal conflict and intervene as early as possible, to prevent problems from shifting focus away from work and to ensure that project participants interact professionally as they meet their responsibilities and execute their roles.

Duration:
2 hours

Course Code:
IHRDC_BEES_809

Content:

- Identify the stages of conflict
- Recognize the structural differences that can cause conflict
- Distinguish between different conflict types and apply strategies to resolve them
- Describe how concern for oneself and concern for others interact to create different styles for dealing with conflict
- Compare different negotiation styles and describe when each should be used
- Demonstrate how power and BATNA can be used as tools during negotiations

PROJECT MANAGEMENT

PM Primer- Cognitive Ability and Decisiveness

Description:

This online course focuses on those critical thinking, decision-making, and cognitive skills vital to effective project management. To be effective, project practitioners need to do more than just apply tools and techniques. They need to think critically about their projects and make good decisions that will put themselves-and their teammates-in positions to succeed. Mastering these "softer" skills will allow team members and key project contributors to diagnose problems and situations in ways that will benefit the project, which will then propel them toward more successful outcomes. As they apply effective cognitive ability and decision-making skills, participants will make efficient choices that will help in dealing with uncertainties, and align work with expectations to lead the group to a successful result.

Duration:
2 hours

Course Code:
IHRDC_BEES_824

Content:

- Explain how critical thinking can be used to enhance decision making
- Describe the steps that teams and individuals use to make effective decisions
- Employ the Davenport-Kim three-stage model of decision making
- Recognize the role that uncertainty and risk play in the decision-making process
- Discuss how the Myers-Briggs Type Indicator helps in understanding decision-making approaches

Managing Real World Projects

Description:

This online, self-paced six-course course presents a stream-lined approach to project management based on the best practices of experienced, effective project managers. It cuts through the clutter and focuses on the key principles of project management in the real world, offering tools and techniques for achieving project success. Managing Real World Projects™ is intended for anyone who needs to lead or manage projects of any kind.

Managing Real World Projects™ provides you with a clear road map for leading a project through the five key project stages: Initiating, Planning, Controlling, Executing and Closing. You'll be exposed to the basic tools employed in each of these stages, including templates for a comprehensive project plan, work breakdown schedules, task list, issue list, risk register and close-out documents. Each stage is illustrated by examples and video commentary by project management professionals, where you can see how best practices are applied to solve project challenges. Taking advantage of online interactivity, the course utilizes vocabulary games, flashcards, and drag-and-drop activities to help you master the material. Numerous mastery quizzes and ten interactive real world case studies allow you to test your understanding of the content, along with a comprehensive course-ending exam. By submitting a question via the course's Ask the Expert link, you get access to project managers who will answer your questions within 24-48 hours.

Duration:
1 hour

Course Code:
IHRDC_BEES_598

Content:

- Understand the five project stages (Initiating, Planning, Controlling, Executing and Closing)
- Recognize constraints for projects (scope, time, and budget)
- Explain key project management terminology
- Outline the keys to a successful project launch
- Understand how to establish project goals and deliverables with stakeholders
- Manage the planning, execution, and control of your projects
- Recognize project management best practice, including Agile, Lean, and other techniques
- Understand project team dynamics
- Understand how to communicate clearly with stakeholders and project team members
- Recognize effective tools for change management
- Explain and employ key tools and techniques employed in the five stages
- Manage the closing process for your project, including transfer, acceptance, and approval

PROJECT MANAGEMENT

4CShare Global Project Management Simulation

Description:

In this simulation, you've been named the project leader for an exciting new project-the development of a knowledge sharing database for your company. The project will involve establishing processes for storing and sharing knowledge in your multinational corporation and developing the 4CShare software itself. Over the course of the project, you'll make decisions about the project scope, schedule, budget, quality, and risk. As you make these decisions, an adaptive scoreboard will reflect the impact of your choices on project success. The goal in the simulation is to optimize positive scores across the following project management factors (as identified by the PMI® 2011 role delineation study): Initiating the Project, Planning the Project, Executing the Project, Monitoring and Controlling the Project, Closing the Project, Cross-Cutting Knowledge and Skills. This simulation is meant to sharpen your understanding of key project management skills.

Duration:
10 hours

Course Code:
IHRDC_BEES_609

Content:

- Leading a project team
- Balancing competing interests, such as project scope, quality, schedule, budget, resources, risk, communications, and procurement considerations throughout every project phase
- Dealing with controversial decisions and the potential for negative team or customer outcomes
- Analyzing schedule, budget, and quality data and using that information to make educated decisions
- Addressing issues related to project procurement

Ethics for Project Managers

Description:

Business ethics represent the standards for right and wrong that govern how businesspeople act. The term also refers to the study of moral principles in the workplace. This one-module course reviews the major ethical issues facing project managers. It looks at the specific challenges project leaders may confront as they deal with team members, vendors, stakeholders, and sponsors.

Duration:
3 hours

Course Code:
IHRDC_BEES_613

Content:

- Discuss the role of ethics in the workplace
- Discuss project managers and the Ethical Triangle and its three components: Individual Ethics, Leadership Ethics, and Governance and Control
- Recognize the key ethical issues in project management
- Describe the provisions of the Project Management Institute Code of Ethics and Professional Conduct
- Discuss the four foundational values (Responsibility, Respect, Fairness, and Honesty) of the PMI® Ethics Code
- Apply ethical principles to project scenarios

PROJECT MANAGEMENT

Emotional Intelligence for Project Managers

Description:

Emotional intelligence (EI) is our ability to identify and control our emotions to achieve positive outcomes in our relationships. Project managers with high EI are better equipped to deal with team members, vendors, stakeholders, and sponsors and to handle and resolve conflicts. This one-module course reviews the underlying concepts of emotional intelligence and explores how project managers can improve, and make use, of their emotional intelligence.

Duration:
3 hours

Course Code:
IHRDC_BEES_615

Content:

- Discuss the role of emotional intelligence for managers and project managers
- Explain why improving emotional intelligence can improve managerial performance
- Recognize the importance of emotional intelligence in successful project management
- Discuss the nine key EI factors
- Apply EI factors to project scenarios

Effectively Managing Project Stakeholders

Description:

This online course is created to help project managers understand and resolve issues that can emerge from interactions among project stakeholders. The course includes a brief tutorial to help students understand familiar strategies for managing stakeholder expectations, as well as ten concise case studies that explore common stakeholder issues. The case studies are designed to simulate the conversations and interactions that occur among project stakeholders, to show learners how to dissect causal elements from these types of conversations-just as they will have to do on their own projects-and to help them prepare appropriate responses. As students work through the case studies, they'll learn effective strategies to resolve stakeholder problems and gain the proficiency necessary to manage interactions and keep their projects on track.

Duration:
3 hours

Course Code:
IHRDC_BEES_698

Content:

- Diagnose the underlying causes of stakeholder problems
- Apply practical tips from experienced practitioners to resolve these problems
- Refine your ability to effectively manage projects and interact with project constituents

PROJECT MANAGEMENT

PMP 1: Introduction to Project Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapters 1, 2, and 3 of A Guide to the Project Management Body of Knowledge (PMBOK®Guide), Sixth Edition. In this course, you will explore some of the organizational issues surrounding project management. You will review how different establishments apply project management methodologies and concepts, and examine the connections between project execution and strategic objectives. You will learn how organizational structures affect the application and performance of project management approaches and activities. And you will analyze and assess the critical characteristics that effective project managers must possess to direct and guide work to its successful conclusion.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1444

Content:

- Explain what a project is and how it can advance organizational goals
- Describe the relationship of projects to subprojects, programs, portfolios, and operations
- Distinguish between functional organizations and project-oriented organizations and explain how the structure of an organization can affect project processes and activities
- Show how enterprise environmental factors and organizational process assets can affect project management processes
- Identify the key competencies of successful project managers and describe their roles in specific organizational settings
- Examine the part that project governance plays in ensuring that projects run efficiently and effectively

PMP 2: Project Processes and the Project Life Cycle (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapters 1 and 2 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will be introduced to the five project management process groups and 10 project management knowledge areas that PMI® sorts all project activities into. You will become familiar with several different types of project life cycle approaches, and discover the 'pre-project' assignments and documents that must be in place before a project can be formally initiated.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1445

Content:

- Describe the project life cycle and its common trends and patterns
- Differentiate among several life cycle approaches and summarize the characteristics of each one
- Explain the ways in which inputs and outputs of various processes determine the relationship among processes
- Describe the overlapping nature of the interaction between the processes and process groups
- Explain the role of the five process groups: Initiating, Planning, Executing, Monitoring and Controlling, and Closing
- Identify the 10 knowledge areas: Project Integration Management, Project Scope Management, Project Schedule Management, Project Cost Management, Project Quality Management, Project Resource Management, Project Communications Management, Project Risk Management, Project Procurement Management, and Project Stakeholder Management
- Recognize that each of the 49 project management processes identified by PMI® can be classified into one knowledge area and one process group
- Examine the part that tailoring plays in successful project management

PROJECT MANAGEMENT

PMP 3: Project Integration Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 3 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn how processes in the Project Integration Management knowledge area encourage relationships among project processes to keep the project's activities coordinated and on track for success. You will begin to create the important project plans and documents that will help you manage, monitor, and control your projects. And you will start to develop thoughts on the actions you will need to take to formally close your project or project phase.

Duration:

3.5 hours

Course Code:

IHRDC_BEES_1446

Content:

- Identify the processes of the Project Integration Management knowledge area
- Describe the inputs, tools and techniques, and outputs of the knowledge area's component processes
- Use the project charter and project management plan to effectively lead, direct, and execute project management activities
- Monitor project progress and employ an integrated change control methodology to prevent unintended consequences
- Capture project knowledge and lessons learned and apply this information to current and future project work
- Formally close a project, phase, or contract

PMP 4: Project Scope Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 5 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn how the processes in the Project Scope Management knowledge area interact with other aspects of the project life cycle in order to shape and define the work for a project. You will learn how to define both project scope and product scope, as well as how to create the scope baseline which acts as a guideline for determining project activities. Additionally, you will learn how to construct a work breakdown structure, how to avoid scope creep, and how to formally accept project deliverables and move on the next steps.

Duration:

3.5 hours

Course Code:

IHRDC_BEES_1447

Content:

- Define scope and explain how to create a project scope statement
- Explain the different methods, tools, and techniques for collecting requirements
- Assess the work that needs to be completed for a project to successfully fulfill its objectives
- Create a work breakdown structure and WBS dictionary
- Describe how a requirements traceability matrix can be used to trace project requirements throughout the project's life cycle
- Describe where scope baselines and performance measurement baselines come from and how they are used to evaluate the success of a project through its life cycle
- Complete project review reports and lead meetings

PROJECT MANAGEMENT

PMP 5: Project Schedule Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 6 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will consider how to best plan and schedule activities. You will familiarize yourself with the various techniques used to calculate and analyze activity time estimates, including ways to estimate the duration of activities. And you will create a working project schedule to ensure that the project will be completed as quickly, efficiently, and effectively as possible.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1448

Content:

- List the Project Schedule Management knowledge area component processes
- Define activities using an activity list, activity attributes, and a milestone list
- Discuss various techniques for estimating duration and know when to apply them
- Describe how project activities can be sequenced
- Demonstrate how a project schedule network diagram is created and read
- Describe schedule network analysis and how it can help to determine the critical path for a project
- Explain how to control a project's schedule by initiating change requests or employing schedule compression techniques

PMP 6: Project Cost Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 7 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will consider how to best estimate costs for activities and the project overall. These estimates will be used to determine a project budget. You will learn how to manage and control project costs, how to participate in earned value management activities, and how to respond if a project is overrunning its budget.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1451

Content:

- Define cost management and its associated cost management plan
- Explain the various inputs of and methods for estimating activity cost
- Describe how to aggregate activity costs to determine budget and both periodic and total project funding requirements
- Identify the cost baseline and performance measurement baseline and their importance in earned value management
- Calculate planned value, earned value, actual cost, schedule variance, cost variance, the schedule performance index, and cost performance index
- Explain how baselines, planned value, earned value, and actual cost can be represented in graphic form
- Calculate the budget at completion, estimate at completion, estimate to complete, and the to-complete performance index and use these concepts to forecast the cost requirements of a project
- Identify the warning signs that a project is falling behind schedule or overrunning its budget and explain the various possible responses
- Explain performance-reporting techniques and updates to project documentation
- Recognize the various approaches to project selection, including return on investment and internal rate of return

PROJECT MANAGEMENT

PMP 7: Project Quality Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 8 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn how the project management team ensures that a project will be completed at the level of quality required by all stakeholders. Throughout a project, there will be many inputs to processes from customers, team members, and others in the involved organizations; in this course, you will see how the management team will use those inputs to plan for, execute, and monitor and control quality.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1450

Content:

- Define quality, quality planning, and quality control
- Explain what aspects of quality and quality control need to be decided on and budgeted for in the planning stage
- Construct quality assurance processes that ensure that outcomes will meet the needs that the project was designed for
- Explain how the project management team should balance the cost of quality with its benefits
- Describe how quality processes use statistical sampling, inspection, and visual representations of data to identify defects in products or processes
- Recognize the similarities and differences among quality tools and techniques, and when and why each can be applied in quality management

PMP 8: Project Resource Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 9 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn how to plan for, acquire, and manage the physical and human resources necessary for project completion. You will learn how to acquire and negotiate the best staff, how to define roles and responsibilities in project documentation, and how to employ the essentials of good people management. In addition, you will learn how to facilitate a team environment and supply a project with the appropriate materials, equipment, facilities, and infrastructure needed for success. You will learn how to properly allocate resources on a project and control their utilization.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1452

Content:

- Describe how staffing is planned for and acquired in an organization
- Explain how internal and external staff will have different management needs
- Recognize and manage for constraints and limited availability of human resources
- Apply resource optimization techniques to deal with limited human resources
- Identify and choose between the various techniques for visually representing the roles and responsibilities of individuals, teams, and organizations
- Describe what makes a successful team and how project managers can assess and develop their teams and individual workers
- Employ effective people management, including how to motivate and manage teams and how to resolve team conflict
- Identify the general approaches to decision making, and how they might be applied to project scenarios

PROJECT MANAGEMENT

PMP 9: Project Communications Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 10 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn how project management teams can effectively communicate with the project's various stakeholders.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1453

Content:

- Describe the basic communication models and how these models can be applied to Project Communications Management techniques
- Identify the various inputs, tools and techniques, and outputs of Project Communications Management activities
- Explain the basics of effective communication in the context of project management
- Describe the importance of the communications management plan
- Conduct communication requirements analysis to determine how communications will be planned for in the communications management plan
- Identify the different methods and technologies of communication, and explain under which circumstances specific methods and technologies are more likely to be successful
- Explain the conventions of creating performance reports that use variance analysis and forecasting techniques to update stakeholders on the progress of the project

PMP 10: Project Risk Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 11 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will define the core elements of risk management, including the risk register and risk report. You will also understand how different types of risks are identified, analyzed, prioritized, tracked, and quantified in order to complete project activities on budget and on schedule.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1454

Content:

- Define risk and explain how it can impact a project
- Identify the components of the risk management plan, risk register, and risk report and their relationship to the project management plan
- Describe the techniques involved in risk identification and analysis
- Explain how the probability and impact of risk can be assessed and how risk events can be prioritized
- Recognize the difference between qualitative risk analysis and quantitative risk analysis and explain when either or both should be used
- Recognize the difference between individual project risks and overall project risks and describe how to respond to each
- Describe how to make project decisions when outcomes are complex and are affected by uncertainty
- Explain how risk planning, risk analysis, risk response planning, and risk monitoring and controlling are related
- Employ various strategies to respond to positive and negative risks
- Explain the Monitor Risks process and recognize that risks must be monitored throughout the project life cycle

PROJECT MANAGEMENT

PMP 11: Project Procurement Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 12 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you'll learn how to create a cohesive procurement management approach to guide all details of project procurement. You'll select the appropriate contract or agreement type for each procurement transaction and work with selected sellers to guarantee results. You'll also monitor and control all activities and actions for products, services, and results acquired from outside of the project team.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1455

Content:

- Define procurement within the context of a project
- Describe the elements of a procurement management plan
- Explain the various roles and responsibilities of buyers and sellers
- Compare contract types and analyze make-or-buy decisions
- Discuss the techniques that contribute to effective project procurement documents
- Identify common criteria for selecting sellers
- Describe the activities involved in controlling procurements and ensuring that sellers are on track to complete deliverables that conform to project requirements
- Explain the importance of negotiating for a suitable contract and ensuring that any changes to the procurement requirements are well-documented
- Describe the circumstances under which project procurements can be closed

PMP 12: Project Stakeholder Management (Sixth Edition)

Description:

This course was designed as a supplemental study guide for the major content areas of Chapter 13 of A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Sixth Edition. In this course, you will learn about how to effectively identify project stakeholders and involve them throughout the project to enhance the prospects for success.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1456

Content:

- Clarify the role of stakeholders such as the project sponsor in determining general and specific details of the project charter
- Identify the individuals, groups, and organizations associated with a project to ensure that all needs and expectations will be considered and evaluated
- Use classification models, such as the power/interest grid and salience model, to categorize stakeholders and consider their impact on the project
- Create stakeholder management strategies to maximize positive stakeholder impacts and minimize negative stakeholder impacts
- Identify gaps between current and desired levels of engagement and incorporate strategies to bring these conditions into alignment
- Employ interpersonal and management skills to address and manage conflicts among stakeholders
- Nurture engagement activities to help the project meet its objectives and satisfy all acceptance criteria
- Modify engagement strategies to ensure that they continue to be effective

PROJECT MANAGEMENT

PMP 13: Practice Exams and Exam Strategies (Sixth Edition)

Description:

This course is designed to give learners an assessment of their readiness to take the Project Management Institute®(PMI®) Project Management Professional (PMP)® Exam. It contains five process group assessments, as well as two 200-question practice exams, which cover the PMI® standard, A Guide to the Project Management Body of Knowledge (PMBOK® Guide). The practice exams provide a comprehensive review of the PMBOK® Guide. You will also review key strategies for preparing for the PMP® Exam.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1457

Content:

- Summarize the structure and requirements of the PMP® Exam
- Explain and apply the key concepts found in the Project Management Institute's Code of Ethics and Professional Conduct
- Describe ways to improve your performance on the PMP® Exam
- Use checklists to quickly review the major areas of knowledge on the PMP® Exam
- Begin your preparation for the PMP® Exam with confidence

PMP Exam Prep Course (Sixth Edition)

Description:

This completely online and self-paced project management program builds successful project managers at all levels of the organization. It provides a comprehensive preparation for the Project Management Professional (PMP)®certification exam including exam-taking tips, 26 comprehensive module quizzes, five process group tests, and two full-length, 200-question practice exams covering the areas of interest from A Guide to the Project Management Body of Knowledge, (PMBOK® Guide), which will provide a report to help you determine your areas of weakness.

Duration:
3.5 hours

Course Code:
IHRDC_BEES_1325

Content:

- Recognize how enterprise environmental factors and organizational process assets affect how projects can be managed
- Explain the five stages of a project life cycle and illustrate how these stages can overlap in time
- Demonstrate how to create a project management plan with subsidiary plans for each of the knowledge areas and explain how progressive elaboration and integrated change management can keep these documents effective and relevant
- Explain the overlapping nature of project activities and practice Project Integration Management to coordinate the various project management processes
- Illustrate how a project's various baselines (including scope, cost, schedule, quality, risk, procurement, and others) are determined, planned for, and managed
- Recognize how to effectively manage human resources and communicate with all stakeholders
- Explain the key methods used to estimate project schedule and cost at the beginning of a project and to forecast cost and schedule variances at any time during the project
- Identify key project stakeholders and continuously engage them in appropriate project activities
- Describe how the project management knowledge contained in the PMBOK® Guide can be used in practice

PROJECT MANAGEMENT

Project Risk Management: PMI-RMP Exam Prep (Sixth Edition)

Description:

This completely online and self-paced nine-module risk management course helps educate project managers in identifying and responding to project risk. This course provides a comprehensive preparation for the Project Management Institute®'s PMI Risk Management Professional (PMI-RMP)® certification exam including exercises, self-assessments, interactive games, and case studies along with exam-taking tips and two full-length, 170-question practice exams covering the required five domains of risk management knowledge.

Duration:

3.5 hours

Course Code:

IHRDC_BEES_1357

Content:

- Explain the risk management process as defined by A Guide to the Project Management Body of Knowledge (PMBOK® Guide)
- Assess stakeholder risk tolerance and manage stakeholder expectations and engagement
- Demonstrate key processes for documenting risk information
- Discuss the steps in developing a risk management plan
- Identify and evaluate relevant risks and their potential impact
- Explain the process of creating a risk register
- Explain key tools and techniques employed in the qualitative and quantitative analysis of risk
- Develop risk response strategies and contingency plans
- Discuss how risk response plans are successfully executed
- Explain how to monitor and control risk, and use lessons learned to refine risk policies and practices
- Recognize best practices in all aspects of risk management

SIX SIGMA/LEAN

Six Sigma Green Belt Certification Exam

Description:

This two-and-a-half hour timed exam tests competency and comprehension of Six Sigma principles, strategies, tools, and techniques. The test includes 100 multiple-choice questions chosen at random from MindEdge's question database, and covers all aspects of the DMAIC methodology and its implementation. Questions are posed in several configurations that ask test takers to identify, calculate, analyze, and apply their knowledge to demonstrate their ability to perform as important members of improvement teams. Test-takers should have in-depth knowledge of Six Sigma concepts and practices. This exam can be purchased as a stand-alone or can be bundled with the MindEdge Six Sigma Green Belt Exam Prep course. The exam prep course provides a thorough preparation for the exam, guiding learners through key foundational and in-depth Six Sigma concepts and skills. (The fee for taking the certification exam is included in the cost of the exam prep course.)

Duration:
25 hours

Course Code:
IHRDC_BEES_948

Content:

Six Sigma Yellow Belt Certification Exam

Description:

This one-and-a-half hour timed exam tests competency and comprehension of Six Sigma principles, strategies, tools, and techniques. The test includes 50 multiple-choice questions chosen at random from MindEdge's question database, and covers all aspects of the DMAIC methodology and its implementation. Questions are posed in several configurations that ask test takers to identify, calculate, analyze, and apply their knowledge to demonstrate their ability to perform as important members of improvement teams. This exam can be purchased as a stand-alone entity or can be bundled with the MindEdge Six Sigma Yellow Belt Exam Prep course. The exam prep course provides a thorough preparation for the exam, guiding learners through key foundational and in-depth Six Sigma concepts and skills. (The fee for taking the certification exam is included in the cost of the exam prep course.)

Duration:
1.5 hours

Course Code:
IHRDC_BEES_957

Content:

SIX SIGMA/LEAN

Lean Six Sigma Green Belt Certification Exam

Description:

This two-and-a-half hour timed exam tests competency and comprehension of Lean Six Sigma principles, strategies, tools, and techniques. The test includes 100 multiple-choice questions chosen at random from MindEdge's question database, and covers all aspects of the DMAIC methodology and its implementation. Questions are posed in several configurations that ask test-takers to identify, calculate, analyze, and apply their knowledge to demonstrate their ability to perform as important members of improvement teams. You should have in-depth knowledge of Lean Six Sigma concepts and practices before deciding to take this certification exam. If you purchase this product, you are purchasing only the exam. However, this exam is also available bundled with the MindEdge Lean Six Sigma Green Belt Exam Prep course. The exam prep course provides a thorough preparation for the exam, guiding learners through key foundational and in-depth Lean Six Sigma concepts and skills. (The fee for taking the certification exam is included in the cost of the exam prep course.)

Duration:
2 hours

Course Code:
IHRDC_BEES_1138

Content:

Six Sigma Basics

Description:

This self-paced course explains the concepts, strategies, tools, and techniques learners will need to complete process improvement projects and activities. The course is divided into eight courses that explain key foundational Six Sigma information, guide students through the five steps of the DMAIC methodology, and demonstrate how a Six Sigma approach can benefit organizations in several, diverse industries or business sectors. Course assignments detail the tools and skills learners will implement as they apply a Six Sigma approach to process improvement activities, and show practitioners how they can contribute as important members of improvement teams. Throughout the course, learners will be tested on their understanding and comprehension of course topics through challenging exercises, interactive games, and case study assignments. Each course also includes comprehensive quizzes and tests that learners can use to gauge their progress and prepare for the 50-question exam at the course end. Video segments from subject matter experts also supplement the course material, to provide real-world examples and enhanced understanding of important concepts and best practices.

Duration:
32 hours

Course Code:
IHRDC_BEES_947

Content:

- Explain the concepts, tools, techniques, and strategies used in Six Sigma projects
- Describe the five stages of the DMAIC methodology and identify the factors that will improve its chances of success
- Choose and apply specific tools and techniques in support of process improvement activities
- Analyze the specific roles and responsibilities of team members and formulate plans to ensure appropriate participation in project assignments
- Examine the interrelationships of tasks, activities, and practices in Six Sigma projects

SUSTAINABLE MANAGEMENT

Corporate Social Responsibility

Description:

Corporate social responsibility (CSR) is the concept of organizations taking responsibility for their impact on society and the environment. Businesses which embrace CSR promote the public interest through what they do (for example, encouraging community growth and development) and what they refrain from doing (for example, eliminating or avoiding practices that harm stakeholders, regardless of whether such practices are legal). CSR is the inclusion of the public interest into corporate decision-making.

Duration:
4 hours

Course Code:
IHRDC_BEES_354

Content:

- Defining Corporate Social Responsibility
- The Scope of CSR
- CSR Standards and Measuring CSR
- CSR and the Corporation
- Self Assessment

Measuring Sustainable Management Performance

Description:

One well-known business saying is that you can't manage what you can't measure. With the growing importance of sustainable management, business leaders must find the appropriate tools and techniques for measuring their organization's sustainability performance.

Duration:
4 hours

Course Code:
IHRDC_BEES_357

Content:

- Sustainability Measurement Tools Overview
- Strategic Performance Measurement
- Sustainability Risk Assessment
- Sustainability Cost Measurement
- Capitol Investments and Return on Investment (ROI)
- External Sustainability Reporting and Verification
- Criticisms of Sustainability Measurement
- Sustainability Measurement Best Practices

SUSTAINABLE MANAGEMENT

Sustainable Management: Leadership Ethics

Description:

Leaders are increasingly being held responsible and accountable for the manner in which they lead--and if they are adhering to ethical behavior when they make decisions. Organizations have learned that the costs of unethical actions can be high, both legally, and from the perspective of brand image and reputation.

Duration:

4 hours

Course Code:

IHRDC_BEES_353

Content:

- An Ethical Framework
- Ethics at Work
- Assessment of Attitudes: Ethics at Work
- Ethical Challenges
- Business Ethics Scenario #1
- Business Ethics Scenario #2
- Business Ethics Scenario #3
- Business Ethics Scenario #4
- Business Ethics Scenario #5
- Leadership Ethics
- Dealing with Ethical Lapses

SUSTAINABLE MANAGEMENT

Triple Bottom Line Accounting

Description:

In order to pursue the goal of sustainability, corporate and government leaders must manage companies and economies in terms of balancing and optimizing the triple bottom line of social, environmental, and economic impacts. The Triple Bottom Line concept, also known as the "3Ps" ("People, Planet, and Profit"), is both a metaphor for thinking about sustainability as well as the basis for a practical framework for accounting and reporting on organizations' activities and impacts. The TBL concept borrows the well-known and widely accepted idea of financial accounting and its "bottom line" and expands it.

Duration:

4 hours

Course Code:

IHRDC_BEES_356

Content:

- Triple Bottom Line Accounting
- The Three Pillars
- TBL: People
- TBL: Planet
- TBL: Profits
- Criticisms of TBL
- TBL Best Practices

SUSTAINABLE MANAGEMENT

Taking the Helm at Coastal Industries Simulation

Description:

Throughout this simulation, you will play the role of the new chief executive officer of Coastal Industries, a fictional manufacturer of industrial transformers. During the simulation, you will be asked to make a series of decisions as Coastal Industries adopts sustainable management practices. These decisions will involve the company's operations, its standing in the community, and its relations with local government and state and federal regulators. Each of your decisions will affect Coastal Industries in different ways. You will be asked to make a series of decisions during the simulation, and each decision will impact the project in different ways. As you make these decisions, an adaptive scoreboard will reflect the impact of your choices on project success.

Duration:

10 hours

Course Code:

IHRDC_BEES_317

Content:

- Leadership Performance
- Board Support
- Employee Relations
- Social Responsibility
- Regulatory Compliance
- Environmental Practices
- Financial Performance

SUSTAINABLE MANAGEMENT

An Overview of Sustainable Management

Description:

Sustainable management is managing a firm so that it generates profits for its owners, protects the environment, and improves the lives of the people with whom it interacts. The business case for sustainable management is that it can help a company's long-run profitability and success.

Duration:

4 hours

Course Code:

IHRDC_BEES_355

Content:

- The Marketing Plan
- Developing Marketing Information
- Market Research
- Target Markets
- Product Marketing
- New Product Development
- Pricing Strategies
- Promotional Mix
- Placement

IHRDC

International Human Resources Development Corporation

Operations & Maintenance

Course Catalog

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FUNDAMENTALS

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For The Oil And Gas Industry

Fundamentals

Basic Principles of Chemistry 1

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the composition of matter and the general characteristics of compounds, mixtures, and solutions. After completing this unit, trainees should be able to identify the particles that make up an atom and describe two ways in which atoms form chemical bonds. They should also be able to explain what compounds and mixtures are, and how they differ from one another. In addition, trainees should be able to describe what a solution is, calculate the weights of materials in a percent-by-weight solution, and explain what a pH measurement represents.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCB1

Objectives:

- **Introduction to Chemistry**
  - Define: material, matter, mass, element, atom, proton, neutron, and electron.
  - Identify the particles that make up an atom.
  - Define: valence electron and ion.
  - Describe two ways in which atoms form chemical bonds.
- **Compounds and Mixtures**
  - Define: compound and chemical reaction.
  - Define mixture.
  - Explain how compounds and mixtures differ from one another.
- **Solutions**
  - Define: solution, solute, solvent, homogeneous, and concentration.
  - Calculate the weights of the materials in a percent-by-weight solution, given the weight of the solution and the percentage of solute.
  - Explain what a pH measurement represents.

Content:

- Introduction to Chemistry
  - Composition of Matter
  - Valence Electrons and Chemical Bonds
- Compounds and Mixtures
  - Compounds
  - Mixtures
- Solutions
  - Characteristics
  - Percent-by-Weight
  - pH Measurements

Fundamentals

Basic Principles of Chemistry 2

Description:

This interactive training unit is designed to familiarize trainees with the principles of chemical reactions, material balancing, and organic chemistry. After completing this unit, trainees should be able to use a chemical equation to explain what occurs during a chemical reaction, and how combustion reactions, replacement reactions, and neutralization occur. Trainees should also be able to define material balancing, and describe the basic steps involved in balancing the materials represented in a simple equation. In addition, trainees should be able to explain what organic chemistry is and how some organic chemicals are named.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCB2

Objectives:

- **Chemical Reactions**
  - Identify three common types of chemical reactions.
  - Define: chemical equation and chemical reaction.
  - Use a chemical equation to explain what occurs during a simple chemical reaction.
  - Define endothermic and exothermic in terms of their application to chemical reactions.
  - Explain how a combustion reaction, replacement reaction, and neutralization reaction occur.
  - Explain how the acidity or alkalinity of a liquid is measured.
- **Material Balancing**
  - Explain the meaning of material balancing.
  - Identify the steps involved in balancing the materials represented in a simple equation.
  - Given the actual weight of one material in a reaction, use the relative weights of the atoms in the reaction to determine the actual weights of the other materials involved.
- **Organic Chemistry**
  - Define organic chemistry.
  - Explain h

Content:

- Chemical Reactions
  - Chemical Equations
  - Combustion Reactions
  - Replacement and Neutralization Reactions
- Material Balancing
  - Steps in Material Balancing
  - Relative and Actual Weights
- Organic Chemistry
  - Basis of Organic Chemistry
  - Naming Organic Chemicals

Fundamentals

Gases and Flowing Liquids

Description:

This interactive training unit is designed to familiarize trainees with general concepts associated with the properties of gases and flowing liquids. After completing this unit, trainees should be able to describe the major properties of gases and explain how these properties are related. They should also be able to explain how pressure can be measured and the effects of flow, velocity, and friction on the head pressure of a liquid.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPGF

Objectives:

- **Gas Properties**
  - Describe the effects of temperature and pressure on gases.
  - Explain how Boyle's Law and Charles' Law relate to the pressure and volume of gases.
  - Explain how the General Gas Law relates to temperature, pressure and volume of a gas.
- **Measuring Pressure**
  - Explain how atmospheric pressure can be measured.
  - Describe the effects of pressure on a manometer.
  - Explain how various scales can be used to measure pressure.
- **Flowing Liquids**
  - Define: flow, flow rate, steady-state conditions, static conditions, head, and head pressure.
  - Describe the effects of flow on pressure.
  - Describe the effects of velocity on pressure.
  - Describe the effects of friction on pressure.

Content:

- Gas Properties
  - Temperature and Pressure Effects
  - Gas Laws
- Measuring Pressure
  - Atmospheric Pressure
  - Manometers
  - Pressure Scales
- Flowing Liquids
  - Flow and Flow Rate
  - Effects of Flowing Liquids

Fundamentals

Heat

Description:

This interactive training unit is designed to introduce trainees to some of the basic principles associated with heat and heat transfer. After completing this unit, trainees should be able to describe some of the effects of heat, the relationship between temperature and thermal energy, and the Law of Energy Conservation. Trainees should also be able to define terms sensible heat and latent heat and to describe the effects of pressure on the temperature at which a substance undergoes a phase change.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPHE

Objectives:

- **What Is Heat?**
  - Describe some of the effects of heat.
  - Describe the relationship between temperature and thermal energy.
  - Describe the Law of Energy Conservation.
- **Phase Changes**
  - Define sensible heat and latent heat.
  - Describe the effects of pressure on the temperature at which a substance undergoes a phase change.

Content:

- What is Heat?
  - Effects of Heat
  - Temperature and Thermal Energy
  - The Law of Energy Conservation
- Phase Changes
  - Sensible Heat and Latent Heat
  - Temperature and Pressure

Fundamentals

Heat Transfer

Description:

This interactive training unit is designed to introduce trainees to the fundamentals of heat transfer and the basic operation of a typical heat exchanger. After completing this unit, trainees should be able to describe the effects of a temperature difference on heat transfer and the three modes of heat transfer. They should also be able to describe the basic operation of a shell and tube heat exchanger and identify problems that can occur in a heat exchanger.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPHT

Objectives:

- **Heat Transfer Fundamentals**
  - Describe the effects of temperature difference on heat transfer.
  - Define specific heat and give examples.
  - Recognize the formula for heat transfer.
- **Modes of Heat Transfer**
  - List and describe the three modes of heat transfer.
  - Describe conduction heat transfer.
  - Describe natural convection and forced convection.
  - Describe how heat transfer takes place between two fluids separated by a solid boundary.
  - Describe what affects heat transfer between two fluids.
  - Describe radiation heat transfer.
- **Heat Exchanger Operation**
  - Describe the general operation of a shell and tube heat exchanger.
  - Describe the operation of a lube oil cooler.
  - Describe problems that can occur in heat exchangers and explain how these problems can be minimized.
  - Describe the insulating effects of rust and scale buildup.

Content:

- Heat Transfer Fundamentals
  - The Process of Heat Transfer
  - Specific Heat
  - Heat Transfer Formula
- Modes of Heat Transfer
  - Conduction
  - Convection
  - Radiation
- Heat Exchanger Operation
  - Shell and Tube Heat Exchangers
  - Heat Exchanger Problems

Fundamentals

Material Balancing

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with using balanced chemical equations to calculate the amounts of reactants and products in process reactions. After completing this unit, trainees should be able to explain what material balancing is, verify that a chemical equation is balanced, and use a balanced equation to calculate the amounts of reactants and products in a reaction when the weight of one reactant is given. They should also be able to identify two basic factors that can limit the production of a process system, perform material balancing for a process system when reactant supply is the limiting factor, and perform material balancing for a system in which a specific amount of product is to be produced.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCMB

Objectives:

- **Chemical Equations**
  - Explain the meaning of material balancing.
  - Verify that a chemical equation is balanced.
  - Define molecular weight and explain how to calculate the weight of a molecule.
  - Calculate the amounts of reactants and products in a reaction when given the weight of one reactant.
- **Limiting Factors**
  - Identify two basic factors that can limit the production of a process system.
  - Convert reactant supplies expressed as total amounts into supply rates.
  - Determine the limiting factor of a process system that is being operated to produce as much product as possible.
  - Perform material balancing for a process system when reactant supply is the limiting factor.
  - Perform material balancing for a system in which a specific amount of product is to be produced.

Content:

- Chemical Equations
  - Equations
  - Molecular Weights
  - Actual Weights
- Limiting Factors
  - Determining the Limiting Factor
  - Determining Reactant Amounts

Fundamentals

Reaction Rates

Description:

This interactive unit is designed to familiarize trainees with basic concepts associated with the rates at which chemical reactions occur. After completing this unit, trainees should be able to describe two factors that determine the rates of reactions, and the effects of temperature, pressure, concentration, and surface area on reaction rates. They should also be able to describe how catalysts affect reaction rates and how temperature and pressure affect equilibrium reactions.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCRR

Objectives:

- **Reaction Rate Factors**
  - Define reaction rate.
  - Explain how chemical reactions occur and describe two factors that determine the rates of reactions.
  - Describe the effects of temperature, pressure, concentration, and surface area on reaction rates.
- **Catalysts**
  - Define catalyst.
  - Describe how adsorption catalysts work.
  - Explain how some catalysts can become poisoned.
  - Describe how catalysts work by forming an intermediate product during a reaction.
- **Equilibrium Reactions**
  - Define equilibrium and equilibrium point.
  - Describe the effects of temperature and pressure on an equilibrium reaction.
  - Describe one way that products can be stabilized.

Content:

- Reaction Rate Factors
  - Chemical Reactions
  - Effects of Variables
- Catalysts
  - Adsorption-Type Catalysts
  - Intermediate-Type Catalysts
- Equilibrium Reactions
  - Equilibrium
  - Temperature and Pressure
  - Stabilizing Products

Fundamentals

Solids and Liquids

Description:

This interactive training unit is designed to familiarize trainees with basic scientific principles that relate to solids and liquids. After completing this unit, trainees should be able to describe the general molecular structure of solids, liquids, and gases. They should also be able to describe specific properties attributed to solids and liquids.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPSL

Objectives:

- **Forms of Matter**
  - Identify the three forms of matter and explain how they are structured.
  - Give a general description of the molecular structure and the characteristics of solids, liquids, and gases.
  - Compare and contrast the molecular structures of different solids.
  - Explain why liquids can flow.
- **Solids**
  - Define mass, density, and stress.
  - Identify five types of stress and their effects on solids.
  - Define elasticity and temperature.
  - Describe the effects of temperature on solids.
- **Liquids**
  - Describe how liquids seek their own level.
  - Define viscosity.
  - Describe the property of wetting and explain why it occurs.
  - Describe buoyancy and explain why it occurs.
  - Describe specific gravity and how it relates to density.
  - Describe the effects of temperature and pressure on liquids.

Content:

- Forms of Matter
- Solids
  - Mass and Density
  - Stress and Elasticity
  - Temperature Effects
- Liquids
  - Properties of Liquids
  - Temperature and Pressure Effects

Fundamentals

Inorganic Chemistry

Description:

Inorganic Chemistry is designed to introduce trainees to some of the terms and principles associated with basic chemistry. The basic structure of an atom is described, and the ways atoms combine with each other are explained. In addition, the periodic table is introduced and used to determine mass relationships described by chemical reactions. This unit also covers how chemical reactions can be affected by various conditions, and special attention is paid to equilibrium reactions.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTINC

Objectives:

- **Chemistry Fundamentals**
  - Define the following terms: matter, element, compound, molecule, proton, neutron, electron, mole, and Avogadro's number.
  - Describe the basic structure of an atom.
  - Explain in general terms how atoms combine with each other.
- **The Periodic Table**
  - Explain how the periodic table is organized.
  - Identify and describe the characteristics of the representative elements.
  - Identify and describe the characteristics of the transition elements.
  - Identify and describe the characteristics of the inner transition elements.
- **Chemical Reactions**
  - Define the term chemical reaction.
  - Explain how a chemical equation can be used to describe a chemical reaction.
  - Explain how a chemical equation can describe a chemical reaction in terms of mass relationsh

Content:

- Chemistry Fundamentals
  - Elements and atoms; Valence electrons and chemical bonds; Moles
- The Periodic Table
  - Periodic table organization
  - Representative elements, Transition elements and Inner transition elements
- Chemical Reactions
  - Chemical equations; Mass relationships; Neutralization reactions
- Reactions and Equilibrium
  - Reaction rates; Equilibrium reactions

Fundamentals

Aliphatic Chemistry

Description:

This unit offers a condensed and simplified lesson on the characteristics and chemical behavior of the aliphatic branch of organic chemistry. The physical properties, molecular structure, and typical reactions of alkanes, alkenes, and alkynes are discussed.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTALC

Objectives:

- **Introduction to Aliphatic Chemistry**
  - Name the two general groups of hydrocarbons.
  - Describe alkanes, alkenes, and alkynes.
  - Explain how hydrocarbon derivatives are formed.
  - Explain what functional groups are and identify several common functional groups.
- **Alkanes and Cycloalkanes**
  - Describe how alkanes are named.
  - Describe the molecular structures and physical properties of alkanes.
  - Describe the molecular structures of cycloalkanes.
- **Alkenes and Dienes**
  - Describe the molecular structure and properties of alkenes and explain how alkenes are named.
  - Describe the molecular structure and properties of dienes and explain how dienes are named.
- **Alkenes and Alkene Reactions**
  - Describe the following alkane reactions

Content:

- Introduction to Aliphatic Chemistry
  - Types of organic compounds
  - Families of aliphatic compounds
  - Hydrocarbon derivatives
- Alkanes and Cycloalkanes
  - Naming alkanes
  - Alkane properties; Alkane molecular structures
  - Cycloalkanes
- Alkenes and Dienes
  - Naming alkenes; Dienes
- Alkenes and Alkene Reactions
  - Alkane reactions: combustion, halogenation, and nitration
  - Alkene reactions: hydrogenation, ozonolysis, hydration, and polymerization
- Alkynes
  - Alkyne properties; Naming alkynes; Alkyne reactions

Fundamentals

Aromatic Chemistry

Description:

This unit is designed to introduce trainees to aromatic compounds and the reactions associated with them. It describes the structures of benzene and benzene-derived compounds and explains how aromatic compounds are named. It also covers various types of benzene reactions and identifies typical compounds produced through benzene reactions. In addition, it covers aryl halides, phenols, ethers, aldehydes, ketones, and arenes.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTARC

Objectives:

- **Introduction to Aromatics**
  - Define the following term aromatic.
  - Describe the basic structure of benzene.
  - Describe the structures of common derivatives of benzene and explain how they are named.
- **Benzene Reactions**
  - Describe the following types of benzene reactions: alkylation, sulfona-tion, halogenation, and nitration.
  - Identify and describe typical compounds produced through benzene reactions.
- **Aromatic Compounds**
  - Describe the following types of aromatic compounds: aryl halides, phenols, ethers, aldehydes, and ketones.
  - Explain what arenes are and describe their structure.

Content:

- Introduction to Aromatics
  - Benzene
  - Benzene-derived hydrocarbons
  - Phenyl groups
- Benzene Reactions
  - Alkylation, Sulfonation, Halogenation and Nitration
  - Products of benzene reactions
- Aromatic Compounds
  - Aryl halides
  - Phenols and aromatic ether compounds
  - Aromatic aldehydes and aromatic ketones
  - Arenes

Fundamentals

Basics of Math

Description:

This interactive training unit is designed to familiarize trainees with basic mathematical applications that can be used on the job. After completing this unit, trainees should be able to interpret measurements that include fractions and decimal values, measurements in English and metric units, and perform mathematical applications involving fractions and decimals. They should also be able to calculate dimensions associated with rectangles, triangles, and circles.

Duration:
2 hours

Course Code:
IHRDC_OM_AMMBA

Objectives:

- **Working With Numbers**
  - Interpret measurements that include fractions.
  - Add and subtract fractional measurements.
  - Multiply and divide fractional measurements.
  - Convert a fraction to a decimal, and a decimal to a fraction.
  - Convert a decimal to a percent, and a percent to a decimal.
  - Perform mathematical operations with decimal numbers.
  - Use a calculator to perform mathematical operations.
  - Round off a decimal to a specific number of places.
  - Interpret measurements in metric units.
- **Angles and Shapes**
  - Explain what an angle is, and how angles are measured.
  - Explain what a rectangle is, and define the terms length and width.
  - Explain what a triangle is, and define the terms base and height.
  - Explain what a circle is, and define the terms diameter and radius.
  - Calculate the perimeter of a rectangle.
  - Calculate the length of the hypotenuse of a right ang

Content:

- Working With Numbers
  - Fractions and Measurements
  - Working With Fractions and Decimals
  - Using a Calculator
  - Metric Measurements
- Angles and Shapes
  - Angles
  - Rectangles, Triangles, and Circles
  - Working With Shapes
- Areas and Volumes

Fundamentals

Basic Mathematical Operations 1

Description:

This interactive training unit is designed to introduce trainees to the basic principles of addition, subtraction, multiplication, and division. After completing this unit, trainees should be able to describe how to add, subtract, and multiply numbers in vertical columns, and how to do short and long division. They should also be able to explain powers of numbers and roots of numbers, as well as shortcuts for multiplying and dividing with multiples of ten.

Duration:
2 hours

Course Code:
IHRDC_OM_AOIB1

Objectives:

- **Addition and Subtraction**
  - Define number line.
  - Describe the basic principles of addition and subtraction.
  - Describe the base 10 number system.
  - Describe how to add and subtract numbers in vertical columns.
- **Multiplication**
  - Describe the basic principles of multiplication.
  - Explain how to use a multiplication table.
  - Describe how to multiply numbers in vertical columns.
  - Describe a shortcut for multiplying with multiples of ten.
  - Explain powers of numbers.
  - Explain roots of numbers.
- **Division**
  - Describe the basic principles of division.
  - Explain how short division is done.
  - Explain how long division is done.
  - Describe a shortcut for dividing with multiples of ten.
  - Describe a shortcut for dividing with powers of numbers.

Content:

- Addition and Subtraction
  - Number Line
  - Addition and Subtraction in Vertical Columns
- Multiplication
  - Principles of Multiplication
  - Multiplication in Vertical Columns
  - Powers and Roots
- Division
  - Principles of Division and Long Division

Fundamentals

Basic Mathematical Operations 2

Description:

This interactive training unit is designed to familiarize trainees with basic mathematical operations involving signed numbers, averaging, rates, fractions, decimals, and conversions. After completing this unit, trainees should be able to perform basic mathematical operations with signed numbers, perform combined operations in the proper order, find the average of a group of numbers, and calculate rates. They should also be able to add, subtract, multiply, and divide with fractions and decimals. Finally, trainees should be able to convert between fractions, decimals, and percents; write numbers using scientific notation; and use conversion tables.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIB2

Objectives:

- **Math Operations**
  - Explain how to do basic math operations with signed numbers.
  - Define grouping symbols.
  - Explain the order in which combined operations are performed.
  - Explain how to calculate averages and rates.
- **Fractions**
  - Explain what a fraction is, and how to add and subtract them.
  - Describe how to get common denominators, and what a lowest common denominator is.
  - Explain how to multiply and divide fractions.
  - Explain how to express a fraction in simplest terms.
  - Explain what a mixed number is, and how to convert whole and mixed numbers to fractions.
- **Decimals and Conversions**
  - Define decimal.
  - Describe basic math operations involving decimals.
  - Describe how to convert between fractions and decimals.
  - Describe how to write numbers using scientific notation.
  - Explain what percents are.
  - List how to conver

Content:

- Math Operations
  - Signed Numbers
  - Combined Operations
  - Averaging
  - Rates
- Fractions
  - Add, Subtract, Multiply and Divide
  - Mixed Numbers
- Decimals and Conversions
  - Decimals
  - Number Conversions
  - Conversion Tables

Fundamentals

Algebra

Description:

This interactive training unit is designed to familiarize trainees with the basic concepts of algebra. After completing this unit, trainees should be able to define terms commonly associated with the use of algebra, isolate an unknown in an equation, and use the processes of distribution and factoring. They should also be able to explain what ratios and proportions are, and the difference between a direct proportion and an inverse proportion. Finally, trainees should be able to use a calculator to solve math problems.

Duration:
2 hours

Course Code:
IHRDC_OM_AOIAL

Objectives:

- **Introduction to Algebra**
  - State the difference between arithmetic and algebraic operations.
  - Define the terms: constant, unknown, variable, and equation.
  - Describe how equations are used to solve an arithmetic or algebraic problem.
  - Explain how to maintain an equation's balance.
  - Describe how the unknown in an equation can be isolated.
  - Describe the operation of distribution.
  - Describe the operation of factoring.
- **Ratios and Proportions**
  - Explain what a ratio is and how ratios can be expressed.
  - Explain the difference between a direct proportion and an inverse proportion.
- **Calculators**
  - Explain how to use a calculator.

Content:

- Introduction to Algebra
  - Basic Principles
  - Isolating an Unknown
  - Distribution
  - Factoring
- Ratios and Proportions
- Calculators
  - Parts of a Calculator
  - Types of Logic

Fundamentals

Binary, Octal, Hexadecimal Numbers

Description:

The PLCs: Numerics training program, or unit, is designed to familiarize trainees with numbering systems and codes commonly used by programmable logic controllers (PLCs). After completing this program, the trainees should be able to interpret place values for decimal, binary, octal, and hexadecimal numbers and convert numbers from one numbering system to another. They should also be able to explain what BCD and ASCII codes are and how they are used.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLNU

Objectives:

- Identify commonly used numbering systems.
- Explain the organization of a positional numbering system.
- Interpret place values for binary numbers.
- Describe ways that signed binary numbers may be represented in a PLC.
- Convert between binary and decimal numbers.
- Interpret place values for octal numbers.
- Convert between octal, binary, and decimal numbers.
- Interpret place values for hexadecimal numbers.
- Convert between hexadecimal, octal, binary, and decimal numbers.
- Explain what BCD code is.
- Express and interpret information in BCD code.
- Explain what ASCII code is.

Content:

- Numbering Systems
  - Numbering System Basics
  - Positional Systems
- Binary Numbering
  - Place Values and Conversions
  - Signed Binary Numbers
- Octal Numbering
  - Place Values and Conversions
- Hexadecimal Numbering
  - Place Values and Conversions
- Codes
  - BCD Code and BCD Conversions
  - ASCII Code

Fundamentals

Boolean Algebra, Part 1

Description:

Boolean algebra, also known as Boolean logic, is a way of calculating truth values based on 0 and 1, or false and true. This system of logic, illustrated by Boolean logic gates, is applied to the construction, inputs, and outputs of applications such as circuitry and computer function. This course outlines the basics of Boolean functions and laws, instructions on writing out truth tables in order to illustrate each of the logic gates and all their possible outputs, instructions on converting these tables into Boolean expressions, how to use Boolean algebra to simplify combinational logic circuits, and how to convert Boolean expressions into Karnaugh maps.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELBOA1

Objectives:

- **Overview**
  - Describe the operation of the five basic gates.
  - Identify the diagram symbol for the five basic gates.
  - Identify Boolean algebra laws and rules for simplifying combinational logic circuits.
- **Logic Circuits**
  - How to convert Boolean expressions into Karnaugh maps.

Content:

- Overview
  - Operation of the five basic gates
  - Diagram symbol for the five basic gates
  - Boolean algebra laws and rules for simplifying combinational logic circuits
- Logic Circuits
  - Convert Boolean expressions into Karnaugh maps

Fundamentals

Boolean Algebra, Part 2

Description:

Boolean algebra, also known as Boolean logic, is a way of calculating truth values based on 0 and 1, or false and true. This system of logic, illustrated by Boolean logic gates, is applied to the construction, inputs, and outputs of applications such as circuitry and computer function. This course outlines the basics of Boolean functions and laws, instructions on writing out truth tables in order to illustrate each of the logic gates and all their possible outputs, instructions on converting these tables into Boolean expressions, how to use Boolean algebra to simplify combinational logic circuits, and how to convert Boolean expressions into Karnaugh maps.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELBOA2

Objectives:

- **Overview**
  - Describe DeMorgan's Theorems.
  - Demonstrate the ability to convert a truth table into a Boolean expression.
- **Logic Circuits**
  - Utilize Boolean algebra laws and rules for simplifying combinational logic circuits.

Content:

- Overview
  - DeMorgan's Theorems
  - Convert a truth table into a Boolean expression
- Logic Circuits
  - Utilize Boolean algebra laws and rules for simplifying combinational logic circuits

Fundamentals

Boolean Algebra, Part 3

Description:

Boolean algebra, also known as Boolean logic, is a way of calculating truth values based on 0 and 1, or false and true. This system of logic, illustrated by Boolean logic gates, is applied to the construction, inputs, and outputs of applications such as circuitry and computer function. This course outlines the basics of Boolean functions and laws, instructions on writing out truth tables in order to illustrate each of the logic gates and all their possible outputs, instructions on converting these tables into Boolean expressions, how to use Boolean algebra to simplify combinational logic circuits, and how to convert Boolean expressions into Karnaugh maps.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELBOA3

Objectives:

- **Overview**
  - Discuss products-of-sums expressions.
- **Logic Circuits**
  - Discuss Karnaugh mapping and how it is performed.
  - Demonstrate Boolean reduction using Karnaugh mapping.

Content:

- Overview
  - Products-of-sums expressions
- Logic Circuits
  - Karnaugh mapping
  - Boolean reduction using Karnaugh mapping

Fundamentals

Formulas, Graphs, and Trends

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with using formulas, reading and interpreting graphs, and detecting and analyzing trends. After completing this unit, trainees should be able to explain what a formula is and how to use formulas to find areas, volumes, and volumetric flow rates. They should also be able to describe how graphs and charts can provide information about process variables. In addition, trainees should be able to describe basic procedures for detecting and analyzing trends.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIFC

Objectives:

- **Formulas**
  - Define formula.
  - Describe how formulas can be used to find areas.
  - Describe how formulas can be used to find volumes.
  - Define flow rate.
  - Describe how to use volumetric flow rate formulas.
- **Graphs, Charts, and Trends**
  - Describe how graphs can provide information about process variables.
  - Describe how charts can provide information about process variables.
  - Describe what a trend is and explain the difference between expected trends and unexpected trends.
  - Describe some basic procedures for detecting a trend.
  - Describe some basic procedures for analyzing a trend.

Content:

- Formulas
  - Area
  - Volume
  - Volumetric Flow Rate
- Graphs, Charts, and Trends
  - Graphs
  - Charts
  - Trends

Fundamentals

Unit Conversion and Scientific Notation

Description:

This unit demonstrates some math fundamentals necessary to perform various calculations in the lab. The metric (SI) measurement system is described and practical instruction is given on the conversion to English units and vice versa. Exponential numbers are explained, and trainees are shown how to perform arithmetic operations with them. Also, the rules for significant figures and rounding are described. Converting between fractions, decimals, and percents is demonstrated; and finally, ratios and proportions are explained and examples of their practical use are shown.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTLT1

Objectives:

- **Units of Measurement**
  - Describe units of measurement in the English system and in the metric/SI system.
  - Describe how conversions can be made between various units of measurement.
- **Exponential Numbers**
  - Describe rules for writing exponential numbers.
  - Explain how to multiply, divide, add, and subtract exponential numbers.
- **Significant Figures and Rounding**
  - Describe rules for significant figures.
  - Describe how to report the results of calculations to the correct number of significant figures.
  - Describe rules for rounding numbers.
- **Percents**
  - Explain how to convert between fractions, decimals, and percents.
  - Explain how to express a ratio between two materials.
  - Explain how to solve a proportion for an unknown valu

Content:

- Units of Measurement
  - English units and Metric/SI units; Conversions
- Exponential Numbers
  - Writing exponential notation; Arithmetic and exponential numbers
- Significant Figures and Rounding
  - Rules of significant figures; Significant figures in calculations
  - Rounding
- Percents
  - Converting a decimal to a percent, a percent to a decimal, a percent to a fraction and a fraction to a percent
  - Working with Percents, Ratios and Proportions

Fundamentals

Calculations in Chemical Solutions

Description:

This unit describes how to perform calculations that are involved in preparing some types of solutions commonly used in labs. Specifically, it discusses calculations required for preparing dilutions, mass percent solutions, volume percent solutions, molar solutions, and normal solutions.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTLT2

Objectives:

- **Dilutions**
  - Define the following terms: solute, solvent, and solution.
  - Describe calculations associated with determining a dilution factor and using a dilution factor to prepare a diluted solution.
  - List three types of solutions commonly used in labs.
- **Percent Solutions**
  - Describe calculations for preparing a mass percent solution.
  - Describe calculations for preparing a volume percent solution.
  - Describe calculations for converting between mass percent and volume percent.
- **Molar Solutions**
  - Define the following terms: formula mass, molecular mass, gram-molecular mass, empirical formula, mole, molarity, and formality.
  - Describe calculations for preparing a molar solution.
  - Describe how formality can be used in lab work.
- **Normal Solutions**

Content:

- Dilutions
  - Solutions; Diluting solutions
  - Total volume of a solution
  - Solutions used in labs
- Percent Solutions
  - Mass percent solutions; Volume percent solutions
  - Converting from mass percent to volume percent and converting from volume percent to mass percent
- Molar Solutions
  - Basic concepts and calculations for preparing molar solutions; Formality
- Normal Solutions
  - Basic concepts and calculations for preparing normal solutions
  - Molality
  - Using tables for preparing standard solutions

Fundamentals

Statistical Analysis for Laboratory Technicians

Description:

This unit introduces basic concepts of statistics and statistical analysis that can be applied to lab work. It defines terms associated with basic statistical concepts and explains how statistical process control (SPC) can be used in labs. It explains how control charts (focusing on an individual X chart) can be used to monitor the performance of analytical systems and interpret the results of analyses.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTLT3

Objectives:

- **Basic Statistical Concepts**
  - Define the following terms: accuracy, precision, data point, data set, mean, variance, and standard deviation.
  - Identify three key factors that affect confidence in the reliability of an analytical measurement.
  - Describe the two types of variations that affect the reliability of analytical data.
  - Explain how to calculate variance and standard deviation.
- **SPC and Normal Distribution**
  - Describe how assumptions affect the validity of answers that are based on math operations associated with statistics.
  - Describe the fundamental differences between applying SPC to production processes and applying SPC to lab work.
  - Define the following terms: confidence limits, confidence interval, and confidence level.
- **Control charts - Part 1**
  - Identify the basic featu

Content:

- Basic Statistical Concepts
  - Accuracy and precision
  - Confidence in data
  - Variations
  - Distribution of data
- SPC and Normal Distribution
  - Assumptions
  - SPC for production processes
  - SPC for lab work
  - Normal distribution
- Control charts - Part 1
  - Basic control chart features
  - The individual X chart
  - Lab technician responsibilities
- Control charts - Part 2
  - Interpreting an individual X chart
  - Maintaining an individual X chart

Fundamentals

Basic Principles of Physics

Description:

This interactive training unit is designed to introduce trainees to scientific principles associated with units of measurement and with force and motion. After completing this unit, trainees should be able to identify fundamental units of measurement for length, time, and mass, and identify fundamental units of measurement for pressure, temperature, flow, and level. They should also be able to explain the relationship between force and motion and describe the three laws of force and motion.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPBP

Objectives:

- **Unit of Measurement**
  - Identify fundamental units of measurement for length, time, and mass.
  - Identify fundamental units of measurement for the process variables pressure, temperature, flow, and level.
- **Force and Motion**
  - Explain the relationship between force and motion.
  - State the three laws of force and motion.
  - Define inertia.
  - Define acceleration.

Content:

- Units of Measurement
  - Fundamental Dimensions
  - Process Variable Measurements
- Force and Motion
  - Introduction
  - Laws of Force and Motion

Fundamentals

Forces and Machines

Description:

This interactive training unit is designed to introduce trainees to scientific principles associated with applied forces and the operation of basic machines. After completing this unit, trainees should be able to define work, power, and efficiency, and explain the mechanical advantage of the inclined plane and the lever. They should also be able to explain the hydraulic principle and the relationship between friction and the operation of machines.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPLM

Objectives:

- **Work, Power, and Efficiency**
  - Define work and explain its relationship to energy.
  - Define power.
  - Explain why efficiency is important to plant operation.
- **Basic Machines**
  - Define mechanical advantage.
  - Explain the mechanical advantage of the inclined plane.
  - Explain the mechanical advantage of the lever.
  - Explain the hydraulic principle and give examples of where it applies.
  - Discuss some of the effects of friction.

Content:

- Work, Power, and Efficiency
  - Work
  - Power
  - Efficiency
- Basic Machines
  - The Inclined Plane
  - The Lever
  - The Hydraulic Principle
  - Friction

Fundamentals

Power and Energy

Description:

This unit will introduce trainees to basic components of a power system and describe how these components are arranged to deliver power to customers. It will also examine the energy conversions that are necessary to produce power in a power plant and discuss basic principles of how an operator responds to emergency conditions.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPE

Objectives:

- **The Power System**
  - State the function of a generator.
  - Define the following terms: unit, watt, and megawatt.
  - Describe how power is typically distributed to customers.
  - Define the following terms: switchyard, substations, and power system.
  - Define demand.
  - Describe the function of the load dispatcher.
  - Explain why there are variations in demand.
  - Explain why supply must always equal demand.
- **Energy Conversion**
  - Explain how energy is converted to produce electricity in fossil fuel plants.
  - State some of the advantages and disadvantages of fossil fuel plants.
  - Explain how energy is converted to produce electricity in gas turbine plants.
  - State some of the advantages and disadvantages of gas turbine plants.
  - Explain how energy is converted to produce electricity in nuclear plants.
  - State some of the advantages and disadvantages of nuclear plants.

Content:

- The Power System
  - Generating Power
  - Distributing Power
  - Demand
- Energy Conversion
  - Fossil Fuel Plants
  - Gas Turbine Plants
  - Hydroelectric Plants
  - Nuclear Power Plants

Fundamentals

Fluid Systems

Description:

This interactive training unit is designed to introduce trainees to the characteristics, components, and operation of fluid systems. After completing this unit, trainees should be able to explain, in general terms, what a plant system is, and what a fluid is. They should also be able to explain the basic layout of a liquid system and describe energy conversions in a liquid system. Trainees should also be able to describe the basic parts of a compressed air system and the basic operation of several gas and vapor system devices.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPFS

Objectives:

- **Liquid Systems**
  - Explain, in general terms, what a plant system is.
  - Explain what a fluid is.
  - Describe the effects of pressure changes on a static fluid.
  - Describe the four basic parts of a liquid system.
  - Describe the effects of energy conversions on a fluid under steady-state conditions.
  - Describe some of the energy conversions that take place in liquid systems.
- **Gas and Vapor Systems**
  - Describe the basic parts of a typical compressed air system.
  - Describe the operation of a jet pump.
  - Describe the operation of a nozzle.
  - Describe the operation of a condenser.

Content:

- Liquid Systems
  - Systems and Fluids
  - Basic System Layout
  - Energy Conversions
- Gas and Vapor Systems
  - Compressed Air System
  - Gas and Vapor System Devices

Fundamentals

Basic Operator Responsibilities

Description:

Modern industrial facilities include complex groups of systems serving a multitude of functions. These systems, which consist of equipment, piping runs, and electrical cables, all work together to process raw materials into final products that can be supplied to customers. Many groups of people are involved in the operation of an industrial facility. This course focuses on the basic responsibilities of the people who operate process systems.

Duration:
2 hours

Course Code:
IHRDC_OM_OTBOR

Objectives:

- **The Operator's Role**
  - Describe operator responsibilities associated with controlling a production process, safe operation of a facility, and fire and accident prevention.
  - Explain why good communications are important in an industrial facility.
- **General Outside Operator Responsibilities**
  - Identify the types of information an incoming operator should find out during a shift changeover.
  - Describe an outside operator's responsibilities during tours and inspections.
  - Describe an outside operator's responsibilities during routine operations.
  - Explain the purpose of work orders.
  - Describe how valve packing can be adjusted.
  - Describe how to safely reset a tripped circuit breaker.
  - Describe how to clean a pump strainer.
- **General Control Room Operator Responsibilities**
  - Describe the general re

Content:

- The Operator's Role
  - Controlling a Production Process, Safe Operation of a Facility, and Fire and Accident Prevention.
- General Outside Operator Responsibilities
  - Shift Shift turnovers, Tours and inspections and Routine Operations
- Maintaining Plant Equipment
  - Work orders, Preparing for maintenance and Performing maintenance
- General Control Room Operator Responsibilities
  - Basic responsibilities
  - Preparing for changes in weather
- Trends
  - Detecting and Analyzing Trends
- Abnormal and Emergency Situations
  - Emergency Operating Procedures and Safety Precautions
  - Fire emergencies and Electric power outages

Fundamentals

Advanced Operator Responsibilities

Description:

This course is designed as a refresher for experienced operators and provides a look at the operator's changing role. The specific areas covered include operator responsibilities for safety, data collection, production, and interpersonal communications.

Duration:

2 hours

Course Code:

IHRDC_OM_OTAOR

Objectives:

- **Safety Responsibilities, Part 1**
  - Describe operator safety responsibilities associated with normal plant conditions.
  - Explain, in simple terms, the purposes of the following regulations: HAZCOM, HAZWOPER, and SARA III.
- **Safety Responsibilities, Part 2**
  - Describe operator safety responsibilities associated with abnormal plant conditions.
  - Describe operator safety responsibilities associated with scheduled plant startups and shutdowns.
  - Describe the operator's role in lockout/tagout procedures and confined space procedures.
- **Data Collection Responsibilities**
  - Describe operator responsibilities associated with scheduled readings, statistical process control (SPC) charts, sample and laboratory analysis reports, and unit logs.
  - Describe the components of a basic communication model.
  - Identify three chara

Content:

- Safety Responsibilities, Part 1
  - Operator safety responsibilities
  - Safety regulations: Hazcom, Hazwoper, SARA III
- Safety Responsibilities, Part 2
  - Operator Safety Responsibilities: Abnormal Plant Conditions and Scheduled Plant Startups and Shutdowns.
  - Operator's Role in Lockout/Tagout Procedures and Confined Space Procedures.
- Data Collection Responsibilities
  - Written and Oral Data Collection.
- Production Responsibilities
- Interpersonal Responsibilities, Part 1
  - Peers, Supervisory Personnel and New Operators
- Interpersonal Responsibilities, Part 2
  - Customers, the Company and the Community

Fundamentals

Basic Refinery Operations

Description:

Refineries produce many different types of products for a variety of uses. For instance, refineries produce gasoline for automobiles and fuel for heating purposes. Although no single refinery produces all types of products, many refineries produce more than one type of product. This course examines the functions of refinery systems and equipment and describes the role of operators in refinery operations.

Duration:
1 hour

Course Code:
IHRDC_OM_ROBRO

Objectives:

- **Refineries**
  - Define the following terms: refinery, system, unit, finished products.
  - Describe the flow path of materials through a refinery.
  - Describe how refinery systems work together to produce finished products.
- **Refinery Equipment**
  - Identify equipment used in a typical process system.
  - Describe the basic functions of equipment used in a typical process system.
- **Furnace And Distillation Process Systems**
  - Identify the components of a simple furnace system.
  - Describe the basic operation of a furnace and a furnace system.
  - Identify two types of distillation systems.
  - Identify the components of a simple distillation system.
  - Describe the basic operation of a pressure column distillation system.
  - Describe the basic operation of a vacuum column distillation system.

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Content:

- Refineries
  - Refinery Definitions and Workflows
- Refinery Equipment
  - Furnace And Distillation Process Systems
    - Fundamentals of Furnace Systems and Distillation Systems
  - Reactor Process Systems
    - Overview of Reactor Process Systems
  - Refinery Instrumentation
    - Process Variables in Refineries and its relationship with the Process Control System
  - Refinery Operations
    - Refinery Operators
    - Safety Equipment and Practices in Refineries

Fundamentals

Refining Basics

Description:

A refinery uses a number of processing units to transform crude oil into a wide variety of products that are marketed to customers. This course examines the basics of crude oil and how it is processed in a refinery.

Duration:
1 hour

Course Code:
IHRDC_OM_ROREB

Objectives:

- **Topic I: What Is Crude Oil?**
  - Define the following terms: crude oil, specific gravity, API gravity, paraffinic crude, and asphaltic crude.
  - Explain the difference between a sweet crude and a sour crude.
- **Topic II: Hydrocarbons**
  - Define the term: hydrocarbon.
  - Given the name of a hydrocarbon, state the number and the arrangement of carbon atoms.
  - Define the following terms: paraffin, olefin, naphthene, and aromatic.
- **Topic III: Crude Oil Distillation**
  - Explain the function of a crude oil distillation unit.
  - List, from lightest to heaviest, typical fractions from a crude oil distillation unit.
- **Topic IV: Gases, SR Gasoline, Naphtha, and Kerosene Processing**
  - Explain how gases, SR gasoline, naphtha, and kerosene from the crude unit are typically processed in a re

Content:

- What Is Crude Oil?
  - Crude Oil Overview, Sweet Crude and Sour Crude
- Hydrocarbons
  - Hydrocarbon Terms and Definitions
- Crude Oil Distillation
  - Functions of Crude Oil Distillation Unit
  - Fractions from a Crude Oil Distillation Unit
- Gases, SR Gasoline, Naphtha, and Kerosene Processing
  - Processing Gases in Refinery
  - Products from Gas Plant, Catalytic Reformer, and Kerosene Processing
- Gas Oils Processing
  - Products from Fluid Catalytic Cracker Unit, Isomerization Unit, and Alkylation Unit
- Residuum Processing
- Motor Fuel Blending
  - Octane Rating, Blending Motor Fuels and Effects of Vapor Pressure

Fundamentals

Preparation in Process Operations

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with on-the-job training (OJT) of plant operators. After completing this unit, trainees should be able to compare OJT and classroom training, and describe the basic steps in a formalized OJT program. They should also be able to explain how to determine specific training needs for a trainee, and describe training materials that are commonly used for OJT.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOPR

Objectives:

- **What is OJT?**
  - Compare OJT and classroom training.
  - List advantages and disadvantages of OJT.
  - Identify the basic steps included in a formal OJT program.
- **Training Needs**
  - Identify sources of information for analyzing an operator's job.
  - Explain what a job and task analysis is.
  - Describe how to profile the trainee and tailor training according to individual needs.
  - Describe how to determine training needs that are to be met specifically through OJT.
- **Training Materials**
  - Explain what a performance objective is.
  - Describe the use of an OJT training checklist.
  - Identify some training aids that can be used for OJT.

Content:

- What is OJT?
  - OJT vs. Classroom Training
  - Pros and Cons
  - Basic Steps
- Training Needs
  - Job and Task Analysis
  - Trainee Profile and determining Training Methods
- Training Materials
  - Objectives and Checklists
  - Training Aids

Fundamentals

Basic Troubleshooting in Process Operations

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with troubleshooting a problem in a process system. After completing this unit, trainees should be able to explain what troubleshooting is, and how it can be carried out as a systematic, logical procedure. They should also be able to explain how to apply the major steps of a basic troubleshooting procedure to a problem in a process.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPOB

Objectives:

- **Introduction**
  - Define troubleshooting.
  - Identify and describe the main steps involved in troubleshooting.
  - Identify various sources of information that can be used for troubleshooting.
  - Explain how the following process of elimination methods are applied in troubleshooting: input/output testing, bracketing, the serial method, and the half-splitting method.
- **Troubleshooting**
  - Describe a basic wastewater treatment process.
  - Describe how to troubleshoot a problem in a wastewater treatment process.

Content:

- Introduction
  - What is Troubleshooting?
  - Process of Elimination
- Troubleshooting
  - Process
  - Problem

Fundamentals

Communication in Process Operations

Description:

This interactive training unit is designed to familiarize trainees with basic operator responsibilities associated with interpersonal relationships and data collection and use. After completing this unit, trainees should be able to describe the components of a basic communication model and an operator's responsibilities for communicating with other plant personnel, customers, and members of the surrounding community. They should also be able to describe operator responsibilities associated with collecting and using written data and participating in effective shift changes.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOCO

Objectives:

- **Interpersonal Responsibilities**
  - Describe the components of a basic communication model.
  - Describe basic operator interpersonal responsibilities with the company, peers, supervisory personnel, personnel in other departments, and new operators.
  - Identify the four steps in an on-the-job training program for new operators.
  - Describe basic operator interpersonal responsibilities with customers and the community.
- **Data Collection and Use**
  - Describe operator responsibilities associated with scheduled readings, statistical process control (SPC) charts, sample and laboratory analysis reports and logs.
  - Identify three characteristics of an effective relief.

Content:

- Interpersonal Responsibilities
  - The Communication Model
  - Inside the Plant
  - Outside the Plant
- Data Collection and Use
  - Written Data
  - Oral Data

Fundamentals

Implementation and Evaluation of Equipment

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with on-the-job training (OJT) of plant operators. After completing this unit, trainees should be able to identify qualities that an effective OJT instructor should possess, and describe considerations associated with scheduling, planning for, and conducting OJT. They should also be able to describe how the trainee, the instructor, and the overall OJT program can be evaluated.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOIE

Objectives:

- **Implementation**
  - Identify qualities and characteristics of an effective OJT instructor.
  - Identify some training strategies that an instructor can use during OJT.
  - Describe considerations involved in scheduling OJT.
  - Identify preparations that should be made before OJT is implemented.
  - Describe methods of conducting OJT.
  - Describe coaching skills that an instructor can use during OJT.
- **Evaluation**
  - Describe how a trainee's performance can be evaluated.
  - Describe how on-the-job training instructors can evaluate themselves and the OJT program.
  - Review the main steps and principles of a typical OJT program.

Content:

- Implementation
  - The OJT Instructor
  - Planning for OJT
  - OJT Methods
- Evaluation
  - Trainee Evaluation
  - Program Evaluation
  - OJT Review

Fundamentals

Introduction to Operator Responsibilities

Description:

This interactive training unit is designed to familiarize trainees with the general responsibilities of an operator in an industrial facility. After completing this unit, trainees should be able to describe operator responsibilities associated with process control, safety, and communication. They should also be able to describe an outside operator's responsibilities during inspections and routine operations, and the general responsibilities of a control room operator. They should also be able to describe the effects that changing weather conditions have on system operation.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOTC

Objectives:

- **Overview**
  - Describe operator responsibilities associated with controlling a production process, safe operation of a facility, and fire and accident prevention.
  - Explain why good communications are important in an industrial facility.
  - Identify the types of information that an oncoming operator should find out during a shift change.
- **Plant Operators**
  - Describe an outside operator's responsibilities during inspections.
  - Describe an outside operator's responsibilities during routine operations.
  - Describe the general responsibilities of a control room operator.
  - Describe the effects of changing weather conditions on system operation.

Content:

- Overview
  - The Operator's Role
- Plant Operators
  - Outside Operators
  - Control Room Operators

Fundamentals

Obtaining Samples

Description:

This interactive training unit is designed to familiarize trainees with the basic concepts associated with obtaining samples of process materials. After completing this unit, trainees should be able to describe hazards associated with sampling and the precautions that may be required. They should also be able to take contaminant-free representative samples of process liquids, solids, and gases.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPOS

Objectives:

- **Introduction**
  - Explain why samples are taken in process systems.
  - Describe some hazards associated with sampling materials.
  - Describe protective clothing that should be worn when taking samples of hazardous and non-hazardous materials.
  - Describe two types of respirators worn when sampling involves materials that produce harmful dust particles or toxic fumes.
- **Liquids**
  - Describe how to keep liquid samples from being contaminated when they are taken.
  - Explain how to make sure that a representative sample of a liquid is obtained.
  - Describe information typically included on a sample label.
- **Solids and Gases**
  - Describe how to obtain contaminant-free representative samples of process solids.
  - Describe how to obtain contaminant-free representative samples of process gases.

Content:

- Introduction
  - Basic Principles
  - Protective Clothing
  - Respirators
- Liquids
  - Preparing to Sample
  - Obtaining a Sample
  - Labeling a Sample
- Solids and Gases
  - Sampling Solids
  - Sampling Gases

Fundamentals

Plant Production and Safety

Description:

This interactive training unit is designed to familiarize trainees with operator responsibilities during routine plant production operations and for ensuring safety during all phases of plant operation. After completing this unit, trainees should be able to describe operator responsibilities associated with routine production duties, preventive maintenance, and troubleshooting. They should also be able to describe operator safety responsibilities for normal and abnormal operations and during scheduled startups and shutdowns. In addition, they should be able to describe the operator's role with respect to permit procedures and government regulations.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOPP

Objectives:

- **Production**
  - Describe operator responsibilities associated with routine production duties, data interpretation, waste disposal, and vapor emissions monitoring.
  - Describe operator responsibilities associated with preventive maintenance.
  - Describe operator responsibilities associated with troubleshooting.
- **Safety**
  - Describe operator safety responsibilities associated with normal plant conditions.
  - Describe operator safety responsibilities associated with abnormal plant conditions.
  - Describe operator safety responsibilities associated with scheduled plant startups and shutdowns.
  - Describe the operator's role in lockout/tagout procedures and confined space procedures.
  - Explain, in simple terms, the purposes of the following regulations: HAZCOM, HAZWOPER, and SARA III.

Content:

- Production
  - Operator Duties
  - Preventive Maintenance and Troubleshooting
- Safety
  - Normal and Abnormal Conditions
  - Startups and Shutdowns
  - Permits and Regulations

Process Examples

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with troubleshooting problems in process systems. After completing this unit, trainees should be able to follow a logical, systematic troubleshooting procedure to identify and correct process problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPOP

Objectives:

- **Exercise 1 - Tank Level**
  - Describe how troubleshooting techniques can be used to find and correct a problem in a process system. The system in this example transfers liquid from a storage tank to a process feed tank.
- **Exercise 2 - Fluid Transfer**
  - Describe how troubleshooting techniques can be used to find and correct a problem in a process system. The system used in this example transfers feed material to a distillation process.
- **Exercise 3 - Process Column**
  - Describe how troubleshooting techniques can be used to find and correct a problem in a process system. The system used in this example is a distillation process.

Content:

- Exercise 1 - Tank Level
- Exercise 2 - Fluid Transfer
- Exercise 3 - Process Column

Fundamentals

Testing Samples

Description:

This interactive training unit is designed to familiarize trainees with basic procedures for performing tests on samples of process materials and products. After completing this unit, trainees should be able to describe how to perform a pH test, a percent solids test, a specific gravity test, and a titration. They should also be able to describe the operation of a gas chromatograph and how it is used to perform tests on complex gas mixtures or solutions.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPTS

Objectives:

- **pH and Percent Solids**
  - Describe how a pH test is performed.
  - Describe how a percent solids test is performed.
- **Specific Gravities and Titrations**
  - Describe how a specific gravity test is performed.
  - Describe how a titration is performed.
- **Gas Chromatographs**
  - Describe how a gas chromatograph operates.
  - Describe how to perform a gas chromatograph test.

Content:

- pH and Percent Solids
  - pH Tests
  - Percent Solids Tests
- Specific Gravities and Titrations
  - Specific Gravity Tests
  - Titrations
- Gas Chromatographs
  - Operation
  - Performing a Test

Fundamentals

Trends, Maintenance, and Emergencies

Description:

This interactive training unit is designed to familiarize trainees with basic operator responsibilities associated with trend analysis, equipment maintenance, and emergency situations. After completing this unit, trainees should be able to describe ways to detect and analyze trends, explain how work orders are used, and describe how to perform some minor maintenance tasks. They should also be able to explain how operators can prepare for emergency situations and describe operator responsibilities during emergencies.

Duration:
2 hours

Course Code:
IHRDC_OM_AOOIM

Objectives:

- **Trends**
  - Describe how trends can be detected.
  - Describe a four-step approach to analyzing trends.
- **Maintaining Equipment**
  - Explain the purpose of work orders.
  - Describe how valve packing can be adjusted.
  - Describe how to safely reset a tripped circuit breaker.
  - Describe how to change a strainer basket in a duplex strainer.
- **Emergency Situations**
  - Explain how operators can prepare for emergency situations.
  - Describe general operator responsibilities during emergency situations.
  - Describe general operator responsibilities during fire emergency situations.

Content:

- Trends
  - Trend Detection
  - Trend Analysis
- Maintaining Equipment
  - Work Orders
  - Operator Tasks
- Emergency Situations
  - Preparing for Emergencies
  - Responding to Emergencies

Fundamentals

Basic Diagrams and Symbols 1

Description:

This interactive training unit is designed to introduce trainees to plant system diagrams and diagram symbols. After completing this unit, trainees should be able to identify and describe the purpose of several kinds of system diagrams, and be able to describe the information found on each type. Trainees should also be able to identify symbols commonly used on flow diagrams, and how to use a flow diagram to trace the flow paths of a system.

Duration:
2 hours

Course Code:
IHRDC_OM_AODB1

Objectives:

- **Types of Diagrams**
  - Identify and describe the purpose of equipment arrangement diagrams, elevation drawings, piping system (flow) diagrams, piping and instrumentation diagrams (P&IDs), electrical diagrams, and legends.
  - In general terms, describe the information found on each type of diagram.
- **Flow Diagram Symbols**
  - Identify some basic symbols associated with flow diagrams.
  - Identify symbols commonly used to represent components in flow diagrams.
  - Describe the basic operation of the components typically found in a fluid system.
- **Reading Diagram Symbols**
  - Identify the four basic parts of a system.
  - Identify the components of a typical fluid system and relate them to their symbols and functions.

Content:

- Types of Diagrams
  - Equipment Location Diagrams
  - System Diagrams
- Flow Diagram Symbols
  - Tanks, Pumps, and Valves
  - Actuators
  - Heat Exchangers
- Reading Diagram Symbols
  - Block Diagrams
  - Flow Diagrams

Fundamentals

Basic Diagrams and Symbols 2

Description:

This interactive training unit is designed to familiarize trainees with symbols commonly used on piping and instrumentation diagrams (P&IDs) and electrical one-line diagrams. After completing this unit, trainees should be able to identify instrument symbols and line symbols used in P&IDs, describe the types of information typically found on a legend, and use a P&ID to locate the components of a system. They should also be able to identify symbols used on electrical one-line diagrams.

Duration:
2 hours

Course Code:
IHRDC_OM_AODB2

Objectives:

- **Piping and Instrumentation Diagrams**
  - Identify instruments using an identification chart.
  - Identify line and instrument symbols used in piping and instrumentation diagrams.
- **Using a System Diagram**
  - Describe the types of information typically found on a legend.
  - Locate the components in a boiler fuel oil system by identifying the symbols used to represent them.
- **Electrical Diagrams**
  - Identify symbols commonly found on one-line electrical diagrams.
  - Trace out a typical one-line diagram and briefly describe its connections.

Content:

- Piping and Instrumentation Diagrams
  - Instrument Symbols
  - Reading a P&ID
- Using a System Diagram
  - Legends
  - Using a System Diagram
- Electrical Diagrams
  - Main Transformer Section
  - Load Center Section

Fundamentals

Blueprints

Description:

This interactive training unit introduces the basic features of construction blueprints. After completing this unit, trainees should be able to describe various types of blueprints; identify lines, symbols, and abbreviations that are commonly found in blueprints; and explain how to properly care for blueprints.

Duration:

2 hours

Course Code:

IHRDC_OM_AEDBL

Objectives:

- **Introduction**
  - Describe what a blueprint is, and identify some of the methods used to create blueprints.
  - Identify two basic types of drawings that can be used to illustrate objects on paper.
  - Describe the types of drawings typically included in a set of blueprints:
    - *Working Drawings* (plan views, elevation drawings, section drawings, detail drawings)
    - *Auxiliary Drawings* (electrical plans, HVAC plans, plumbing plans, door and window schedules, framing plans)
  - Describe the basic elements of a blueprint, including the design drawing area, title block, revision block, legend and scale.
- **Scales and Symbols**
  - Describe the Engineer's, Architect's and Metric scales commonly used as measuring tools for blueprints.
  - Describe the following types of lines commonly used on blueprints:
    - Property lines
    - Boundary li

Content:

- Introduction
  - What is a Blueprint?
  - Working Drawings
  - Parts of a Blueprint
- Scales and Symbols
  - Types of Scales
  - Line Scales
  - Symbols
  - Abbreviations
- Using Blueprints
  - Dimensions
  - Care of Blueprints

Fundamentals

Electrical Diagrams

Description:

This interactive training unit is designed to familiarize trainees with various types of electrical diagrams. After completing this unit, trainees should be able to explain why symbols are used on electrical diagrams, and how to obtain information from a title block and an equipment location index. They should also be able to explain how to use each of the following types of diagrams: block, single line, schematic, wiring, connection, interconnection, and raceway.

Duration:
2 hours

Course Code:
IHRDC_OM_AEDEL

Objectives:

- **Diagram Basics**
  - Explain why symbols are used on electrical diagrams.
  - State the purpose of the American Standard Device Function Numbers Table and the Standard Diagram Abbreviations Table. State the purpose of legends on electrical diagrams.
  - Describe information commonly found in title blocks on electrical diagrams.
  - State the purpose of notes on electrical diagrams.
  - Define *equipment location index*.
  - Describe how to use an equipment location index.
- **Types of Diagrams**
  - State the purpose of a block diagram.
  - State the purpose of a single line diagram.
  - Identify symbols commonly used on single line diagrams.
  - Describe information that can be found on single line diagrams.
  - State the purpose of a schematic diagram.
  - Describe how to read a schematic diagram.
  - State the purpose of a wiring diagram.
  - Describe how to use a wiring diagra

Content:

- Diagram Basics
  - Symbols
  - Title Blocks
  - Equipment Location Index
- Types of Diagrams
  - Block Diagrams
  - Single Line Diagrams
  - Schematic Diagrams
  - Wiring Diagrams
  - Connection Diagrams
  - Raceway Diagrams

Fundamentals

Flow and Electrical Diagrams

Description:

This interactive training unit is designed to familiarize trainees with the use of flow diagrams and electrical one-line diagrams. After completing this unit, trainees should be able to use a flow diagram to trace the flow of materials through a system, and use a flow diagram and a valve lineup checklist to line up valves in a system. They should also be able to use an electrical one-line diagram to learn the components and layout of an electrical system, and to determine how to isolate a piece of equipment for maintenance or repair.

Duration:

2 hours

Course Code:

IHRDC_OM_AODUF

Objectives:

- **Using Flow Diagrams**
  - Describe how flow diagrams can be used to become familiar with a system.
  - Describe how flow diagrams can be used to line up valves.
  - Describe the relationship between flow diagrams and valve lineup checklists.
- **Using Electrical Diagrams**
  - Describe how electrical one-line diagrams can be used to learn the components and layouts of electrical systems.
  - Describe how electrical one-line diagrams can be used to determine how to isolate equipment for maintenance and repairs.

Content:

- Using Flow Diagrams
  - Learning a Plant System
  - Lining Up Valves
- Using Electrical Diagrams
  - Learning an Electrical System
  - Isolating Equipment

Fundamentals

Industrial Process Systems

Description:

This interactive training unit is designed to introduce trainees to plant system diagrams and diagram symbols. After completing this unit, trainees should be able to identify and describe the purpose of several kinds of system diagrams, and describe the information found on each type. Trainees should also be able to identify symbols commonly used on piping and instrumentation diagrams (P&IDs), describe the types of information typically found on a legend, and use a P&ID to locate the components of a system.

Duration:

2 hours

Course Code:

IHRDC_OM_AEDPR

Objectives:

- **Types of Diagrams**
  - Identify and describe the purpose of equipment arrangement diagrams, elevation drawings, piping system (flow) diagrams, piping and instrumentation diagrams (P&IDs), electrical diagrams, and legends.
  - Describe, in general terms, the information found on each type of diagram.
- **Flow Diagram Symbols**
  - Identify some of the basic symbols associated with flow diagrams.
  - Identify symbols commonly used to represent components in flow diagrams.
  - Briefly describe the basic operation of the components typically found in a fluid system.
- **Piping and Instrumentation Diagrams**
  - Identify instruments using an identification chart.
  - Identify line symbols and instrument symbols used in piping and instrumentation diagrams.
- **Using a System Diagram**
  - Describe the types of information typically fo

Content:

- Types of Diagrams
  - Equipment Location Diagrams
  - System Diagrams
- Flow Diagram Symbols
  - Tanks, Pumps, and Valves
  - Actuators
  - Heat Exchangers
- Using a System Diagram
  - Legends
  - Using a System Diagram

Fundamentals

Piping and Instrumentation Diagrams

Description:

This interactive training unit is designed to make trainees familiar with the use of piping and instrumentation diagrams (P&IDs). After completing this unit, trainees should be able to describe the kinds of information that can be found on a P&ID and explain why this information is useful. They should also be able to explain how to use P&IDs to troubleshoot system problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AODUI

Objectives:

- **Introduction**
  - Describe the types of information provided by P&IDs and explain why this information is useful.
  - Describe how a P&ID can be used to become familiar with the instrumentation associated with a system.
- **Troubleshooting**
  - Describe how P&IDs can be useful in troubleshooting problems.

Content:

- Introduction
  - Information on P&IDs
  - Learning a System
- Troubleshooting
  - Water Treatment System Problem
  - De-Aerator System Problem

Fundamentals

AC Circuits

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the operation of AC circuits. After completing this unit, trainees should be able to explain how current flows through AC circuits and how AC current and voltage are affected by inductance and capacitance. They should also be able to define true power, reactive power, apparent power, and power factor, and to identify various types of single-phase and three-phase systems.

Duration:
2 hours

Course Code:
IHRDC_OM_AEEAC

Objectives:

- **Alternating Current**
  - Explain the difference between direct current and alternating current.
  - Explain how current flow and polarity change in AC circuits.
  - Describe a sine wave that represents AC voltage.
  - Explain what frequency is, and how it is measured.
  - Define peak value, peak-to-peak value, and effective value with respect to AC voltage and current.
- **Inductance**
  - Define inductance and inductive reactance.
  - Explain how inductive reactance limits current flow.
  - Explain how the inductive reactance in a circuit can be increased.
  - Describe the effects of inductance on current and voltage.
- **Capacitance**
  - Define capacitance and capacitive reactance.
  - Explain how a capacitor is charged.
  - Describe the effects of capacitance on current and voltage.
- **AC Power**
  - Differentiate between

Content:

- Alternating Current
  - Current Flow
  - Sine Waves
  - Peak Values and Effective Values
- Inductance
  - Inductance and Inductive Reactance
  - Factors That Affect Inductive Reactance
  - Inductance, Current, and Voltage
- Capacitance
  - Capacitance and Capacitive Reactance
  - Capacitance, Current and Voltage
- AC Power
  - True Power, Reactive Power, and Apparent Power
  - Single Phase and Three-Phase Systems

Fundamentals

Basic Electrical Circuits

Description:

This interactive training unit is designed to familiarize trainees with basic principles associated with the parts and operation of electrical circuits. After completing this unit, trainees should be able to identify the parts of a basic circuit, describe the relationships between voltage, current, and resistance in a circuit, explain how current flows through series circuits and parallel circuits, describe the basic operation of transformers, fuses, circuit breakers, and solenoids, and explain how voltmeters and ammeters can help operators detect electrical problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPBC

Objectives:

- **Basic Circuits**
  - List the parts of a basic circuit.
  - Explain how Ohm's Law describes the relationships between current, voltage, and resistance in a circuit.
  - Explain the basic difference between series circuits and parallel circuits with respect to current flow.
  - Describe the basic operation of a transformer.
  - Explain the difference between a step-up transformer and a step-down transformer.
- **Protection and Indicators**
  - State the general function of fuses and circuit breakers.
  - Describe the basic operation of a fuse.
  - Describe the basic operation of a circuit breaker.
  - Describe the basic operation of a solenoid.
  - Explain how voltmeters and ammeters can help personnel spot electrical problems before equipment damage occurs.

Content:

- Basic Circuits
  - Parts of a Circuit
  - Ohm's Law
  - Series and Parallel Circuits
  - Transformers
- Protection and Indicators
  - Protective Equipment
  - Voltmeters and Ammeters

Fundamentals

Basic Electrical Principles

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of electricity and the basic operation of electric motors. After completing this unit, trainees should be able to explain what electricity is, and how it can be produced by chemical action, heat, light, and magnetic effects. They should also be able to describe the basic operation of a DC motor, a single-phase AC motor, and a three-phase AC motor.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPBE

Objectives:

- **Electricity**
  - Define the following terms: electrical potential, current, and voltage.
  - Describe three sources of electrical potential: chemical action, heat, and light.
  - List the three elements necessary to create an electrical potential using magnetic effects.
  - Recognize and describe a sine wave.
  - Explain the basic differences between single-phase power and three-phase power.
- **Electric Motors**
  - Describe basic motor action.
  - Describe the principle of operation of a DC motor.
  - Describe the principle of operation of an AC motor.

Content:

- Electricity
  - What is Electricity?
  - Chemical Action, Heat, and Light
  - Electricity, Magnetism, and Alternating Current
- Electric Motors
  - Basic Motor Operation
  - DC Motor Operation
  - AC Motor Operation

Fundamentals

Basic Electrical Test Equipment

Description:

The Basic Electrical Test Equipment training program, or unit, is designed to familiarize trainees with various types of electrical test instruments. After completing this program, the trainees should be able to follow safe work practices and procedures while properly using circuit testers, multimeters, ammeters, megohmmeters, and digital low resistance ohmmeters.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCBE

Objectives:

- Follow safe work practices and procedures while using electrical test equipment.
- Use circuit testers to indicate the presence of energized electrical circuits.
- Use an analog multimeter to measure voltage, resistance, and current in AC and DC circuits.
- Use a digital multimeter to measure voltage, resistance, and current in AC and DC circuits.
- Identify in-line and clamp-on ammeters.
- Use an analog ammeter to measure current through a conductor.
- Use a digital ammeter to measure current through a conductor.
- Use a megohmmeter to test the insulation resistance of a conductor, transformer, and motor.
- Explain how to measure the resistance of electrical circuits and equipment with a DLRO.

Content:

- Test Equipment Safety
  - Safe Work Practices
- Circuit Testers
  - Basic Operation
- Multimeters
  - Basic Operation
- Ammeters
  - Basic Operation
- Megohmmeters
  - Basic Operation
- DLRO
  - Basic Operation

Fundamentals

Basic Electricity Review

Description:

This interactive training unit is designed to familiarize trainees with some of the basic principles associated with electricity and electrical circuits. After completing this unit, trainees should be able to explain where electricity comes from; what voltage, current, and resistance are; and how their values can be calculated for various types of circuits. They should also be able to explain how electrical circuits are affected by induction, inductance, and capacitance.

Duration:
2 hours

Course Code:
IHRDC_OM_AEBER

Objectives:

- **Basic Concepts**
  - Explain what atoms are, and how they are constructed.
  - Explain what voltage is, and how it can be produced.
  - Explain what current is, and state the basic difference between direct current and alternating current.
  - Explain what resistance is, and state the basic difference between a conductor and an insulator.
  - Explain how voltage, current, and resistance can be measured.
  - Explain what power and electrical energy are and how they can be measured.
  - Explain how Ohm's Law relates to current, voltage, and resistance.
  - Explain how to use Ohm's Law to calculate current, voltage, or resistance when the other two values are known.
- **Circuit Types**
  - Describe the basic operating principles of a series circuit.
  - Explain how to calculate values for current, voltage, and resistance in a series circuit.
  - Describe the basic operating principles of a parallel circui

Content:

- Basic Concepts
  - Where Does Electricity Come From?
  - Basic Electrical Quantities
  - Ohm's Law
- Circuit Types
  - Series
  - Parallel
  - Series-Parallel
- Circuit Characteristics
  - Induction
  - Inductance
  - Capacitance

Fundamentals

Sources of Electricity

Description:

Sources of electricity typically refer to the different types of fuel or power used to generate electricity. With the exception of solar power, these sources all involve spinning a copper wire between magnets. This course describes how electricity is produced through electrochemical production, magnetic induction, and the photoelectric effect.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELSOE

Objectives:

- **Overview**
  - Describe the electrochemical production of electricity.
  - Describe how magnetic induction produces electricity.
  - Describe the photoelectric effect and how it produces electricity.
  - Discuss thermoelectricity and its uses.

Content:

- Overview
  - Electrochemical production of electricity
  - Produce electricity using magnetic induction
  - Photoelectric effect and how it produces electricity
  - Thermoelectricity and its uses

Fundamentals

Voltage and Current Principles

Description:

Voltage, electromotive force (emf), or potential difference is described as the pressure or force that causes electrons to move in a conductor. Electron current, or amperage, is described as the movement of free electrons through a conductor. This course introduces the principles of voltage and current through a discussion of the components of an atom and their charges as well as electrostatic forces, electromotive forces, and free electrons.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELVAC

Objectives:

- **Overview**
  - List the components of an atom and their charges.
- **Electrostatics**
  - Describe electrostatic force and state the Law of Electrical Charges.
  - Describe an electrostatic field.
- **Current Principles**
  - Explain the electromotive force and the units in which it is measured.
  - Discuss the role free electrons play in the flow of electricity.

Content:

- Overview
  - Components of an atom and their charges
- Electrostatics
  - Electrostatic force and the Law of Electrical Charges
  - Electrostatic field
- Current Principles
  - Electromotive force and the units in which it is measured
  - Role of free electrons in the flow of electricity

Fundamentals

Power Generation and Hydrogen Cooling

Description:

This interactive training unit is designed to familiarize trainees with the basic operation of an AC generator and auxiliary systems and components associated with it. After completing this unit, trainees should be able to explain how voltage is induced in an AC generator, how an AC generator produces current, and how an AC generator can be cooled.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPGE

Objectives:

- **Generating Electricity**
  - Name the basic parts of a generator and describe the function of each in inducing voltage.
  - Describe the primary difference between a single-phase generator and a threephase generator.
  - Name two factors that determine the frequency of the current produced by a generator.
  - Explain why the frequency of a generator's output must be controlled.
  - Explain the function of the exciter in a generator.
  - Name the parts of a DC exciter and the parts of a brushless exciter and describe their functions.
- **Generator Cooling**
  - Explain why a large generator is typically cooled with hydrogen instead of air.
  - Explain the function of an oil seal in a hydrogen-cooled generator.
  - Describe how hydrogen is supplied to a generator cooling system.
  - Explain the purpose of each of the following components in a hydrogen generator cooling system: purity analyzer, core monitor

Content:

- Generating Electricity
  - Principles of Induction
  - Output Frequency
  - Generator Excitation
- Generator Cooling
  - Hydrogen Cooling
  - Cooling Auxiliary Systems
  - Gas Purging
  - Stator Cooling System

Fundamentals

The Steam Cycle

Description:

In this unit, main components of the steam cycle in a fossil fuel fired power plant will be identified. The unit will also trace the order in which steam and water flow through these components in order to show how the components are arranged.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPSC

Objectives:

- **Components**
  - Describe how a boiler works.
  - Describe how fuel and air are supplied to a boiler.
  - Describe how a turbine works.
  - Describe how a condenser works.
  - Describe the function of the condensate-feedwater system.
  - Describe the function of the circulating water system.
  - Describe the function of the makeup water system.
- **Flow**
  - Describe how steam and water move through the steam cycle.
  - Describe how the flow of steam and the flow of water are controlled.
  - Describe how the flow of fuel to the boiler can be controlled.
  - Describe three general actions that must be taken during any emergency.
  - Describe the emergency actions that must be taken if there is a loss of flame in the boiler.

Content:

- Components
  - Boilers
  - Turbines
  - Condensers
- Flow
  - Movement of Steam and Water
  - Steam and Water Flow Control
  - Fuel Flow Control
  - Emergencies

Fundamentals

Basic Control Charts

Description:

This interactive training unit is designed to familiarize trainees with some of the basic control charts used in Statistical Process Control (SPC). After completing this unit, trainees should be able to describe the characteristics of X+ charts, R charts, moving X+ charts, moving R charts, and individual X charts. They should also be able to explain what each chart represents and how to plot values on each chart.

Duration:

2 hours

Course Code:

IHRDC_OM_AOSBC

Objectives:

- **Control Charts - 1**
  - Describe how SPC is helpful in responding to an out-of-control process.
  - Explain what X+ charts represent.
  - Describe how to plot values on an X+ chart.
  - Explain what R charts represent.
  - Describe how to plot values on an R chart.
  - Explain why an X+ and an R chart are commonly used together.
  - Describe how to recognize abnormal variations on X+ charts and R charts.
- **Control Charts - 2**
  - Describe the characteristics of moving X+ charts.
  - Describe how to plot values on a moving X+ chart.
  - Describe the characteristics of moving R charts.
  - Describe how to plot values on a moving R chart.
  - Describe the characteristics of individual X charts.
  - Describe how to plot values on an individual X chart.

Content:

- Control Charts - 1
  - SPC and Control Charts
  - X+ Charts
  - R Charts
  - Examples
- Control Charts - 2
  - Moving X+ Charts
  - Moving R Charts
  - Individual X Charts

Fundamentals

Introduction to Process Control

Description:

The Introduction training program, or unit, is designed to familiarize trainees with the basic elements, terminology, and functions of control systems. After completing this program, the trainees should be able to identify and describe various types of input and output devices that are commonly used with automated control systems. They should also be able to identify and describe common types of control devices and control loop arrangement.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCIN

Objectives:

- Define terms commonly associated with the input side of a control system.
- Identify and describe common types of temperature sensors that provide input information to a control system.
- Identify and describe common types of position sensors.
- Identify and describe common types of pressure sensors, flow sensors, and level sensors.
- Identify and describe common types of electric instruments, timers, counters, recorders, and pneumatic sensors.
- Identify and describe common actuating devices used in the output side of a control system.
- Describe common decision-making devices that connect the input and output elements in a control system.
- Describe common control loop arrangements used in automatic control systems.

Content:

- Input Elements
  - Terminology
  - Temperature Sensors
  - Position Sensors
  - Pressure, Flow, and Level Sensors
  - Other Input Devices
- Output Elements
  - Actuating Devices
- Control Elements
  - Decision-Making Devices
  - Control Loops

Fundamentals

Introduction to Statistical Process Control

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of Statistical Process Control (SPC). After completing this unit, trainees should be able to explain what SPC is and how it can be applied to a process. They should also be able to describe the basic elements of an SPC control chart and relate an SPC control chart to an X-Y graph and to a normal distribution curve.

Duration:
2 hours

Course Code:
IHRDC_OM_AOSIN

Objectives:

- **What is SPC?**
  - Define quality in terms of the process industry.
  - Explain what Statistical Process Control (SPC) is.
  - Describe the benefits of SPC.
  - Describe how SPC was developed.
- **Applying SPC**
  - Describe what a process is.
  - Identify factors that affect a process.
  - Describe the two basic types of variation in a process.
  - Identify factors that affect how SPC is applied to a process.
- **Charts**
  - Describe how to plot values on a basic X-Y graph.
  - Explain what a histogram is and how it relates to SPC control charts.
  - Explain what a standard deviation is.
  - Identify the basic elements of a typical Shewhart control chart.
  - Relate a Shewhart control chart to a normal distribution curve.

Content:

- What is SPC?
  - SPC and Product Quality
  - Origin of SPC
- Applying SPC
  - Factors Affecting a Process
  - Application to a Process
- Charts
  - X-Y Graph
  - Histogram
  - Shewhart Control Chart

Fundamentals

Process Dynamics and Measurement

Description:

This interactive training unit is designed to familiarize trainees with the characteristics of dynamic process operation and with devices that are commonly used to measure process variables. After completing this unit, trainees should be able to explain what resistance and capacitance are in process systems and to describe factors that affect the response of a process system to operating changes and process disturbances. Trainees should also be able to describe devices that can be used to measure pressure, flow, level, and temperature.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPD

Objectives:

- **Dynamic Operation**
  - Describe resistance and capacitance in process systems.
  - Describe and give examples of system characteristics between periods of steady-state conditions when changes occur.
- **Process Variable Measurement**
  - Describe ways that pressure can be measured.
  - Describe ways that flow can be measured.
  - Describe ways that level can be measured.
  - Describe ways that temperature can be measured.

Content:

- Dynamic Operation
  - Resistance and Capacitance
  - System Response to Changes
- Process Variable Measurement
  - Pressure Measurement Devices
  - Flow Measurement Devices
  - Level Measurement Devices
  - Temperature Measurement Devices

Fundamentals

Process Variations

Description:

This interactive training unit is designed to familiarize trainees with some basic techniques for using Statistical Process Control (SPC) to recognize and respond to variations in plant processes. After completing this unit, trainees should be able to describe how plotted values on control charts can be interpreted, describe how an operator can use SPC to recognize and respond to out-of-control conditions and process instability, describe basic considerations for using SPC with a computer, and explain how to use various types of attribute charts.

Duration:

2 hours

Course Code:

IHRDC_OM_AOSPV

Objectives:

- **Control Charts**
  - Describe how plotted values on control charts can be interpreted.
  - Describe common patterns of instability and identify conditions that can cause these patterns to occur.
- **Operating with SPC**
  - Describe how an operator can use SPC to recognize and respond to problems in a process.
  - Define CUSUM and explain how it can be used.
  - Describe how using CUSUM compares to using control charts.
  - Describe two common causes of an off-aim condition.
  - Describe how to reset CUSUM and how to set a new aim.
- **Attribute Charts**
  - Define the terms defect and defective product.
  - Describe how to use C charts, U Charts, NP charts, and P charts.

Content:

- Control Charts
  - Interpreting Charts
  - Recognizing Patterns
- Operating With SPC
  - Using SPC
  - CUSUM
- Attribute Charts
  - Types of Charts

Fundamentals

Introduction to Hand Tools

Description:

This interactive training unit is designed to familiarize trainees with the proper use of hand tools. After completing this unit, trainees should be able to explain how to properly use hammers, punches, prying tools, screwdrivers, wrenches, measuring tools, cutting tools, vises and clamps.

Duration:

2 hours

Course Code:

IHRDC_OM_AMTIH

Objectives:

- **Hammers, Punches, and Prying Tools**
  - Explain how to properly use a hammer. Describe the difference between a claw hammer and a ball peen hammer. Explain how to properly use a sledgehammer.
  - Explain how to properly use a wedge.
  - Explain how to properly use a punch. Identify two types of punches.
  - Explain how to properly use a ripping bar.
  - Explain how to properly use a nail puller.
- **Screwdrivers and Wrenches**
  - Explain how to properly use a screwdriver. Describe the difference between a straight-blade screwdriver and a Phillips-head screwdriver.
  - Explain the proper use of non-adjustable, socket and torque wrenches.
- **Measuring Tools**
  - Define the terms *level* and *plumb*. Explain the proper uses of a level, a plumb bob and a chalk line.
  - Explain how to properly use a framing square and a combination square.
  - Explain how to

Content:

- Hammers, Punches, and Prying Tools
  - Hammers, sledgehammers, wedges and punches
  - Ripping Bars and nail pullers
- Screwdrivers and Wrenches
  - Screwdrivers
  - Wrenches and socket wrenches
- Measuring Tools
  - Levels, plumb bobs and chalk lines
  - Squares, rulers and measuring tapes
- Cutting Tools
  - Saws, files and chisels and utility knives

Fundamentals

Introduction to Power Tools

Description:

This interactive training unit is designed to familiarize trainees with the proper use of various types of power tools. After completing this unit, trainees should be able to explain how to properly use and maintain power drills, power saws, power grinders, jackhammers, and hydraulic jacks.

Duration:

2 hours

Course Code:

IHRDC_OM_AMTIP

Objectives:

- **Types of Power Tools**
  - Identify and describe some common ways of classifying power tools.
  - Identify and describe commonly used types of power drills.
  - Identify and describe commonly used types of power saws.
  - Identify and describe commonly used types of power grinders.
  - Identify and describe common examples of jackhammers and hydraulic jacks.
- **Power Tool Safety**
  - Describe safety procedures associated with the use of power tools in general.
  - Describe safety procedures associated specifically with the use of electric power tools.
  - Describe safety precautions and procedures associated specifically with the use of pneumatic power tools.
- **Power Tool Operation and Maintenance**
  - Describe the basic procedures for the safe operation and proper maintenance of different types of power drills.
  - Describe the basic procedures for the safe oper

Content:

- Types of Power Tools
  - Power Tool Classifications
  - Power Drills, Power Saws, Power Grinders
  - Jackhammers and Hydraulic Jacks
- Power Tool Safety
  - General Safety Concerns
  - Electric Tool and Pneumatic Tool Safety
- Power Tool Operation and Maintenance
  - Using Power Drills, Power Saws and Power Grinders
  - Using Jackhammers and Hydraulic Jacks

Fundamentals

Precision Measurement Instruments

Description:

This interactive training unit is designed to familiarize trainees with use of vernier calipers, different types of micrometers, dial indicators, and fixed gauges. This program also describes basic calibration procedures for several types of instruments and some basic guidelines for caring for precision measurement tools.

Duration:

2 hours

Course Code:

IHRDC_OM_AMTMI

Objectives:

- **Vernier Caliper**
  - Identify the purpose and parts of a vernier caliper.
  - Explain the procedures for using a vernier caliper properly.
  - Demonstrate how to read a vernier scale.
- **Micrometers**
  - Demonstrate the procedure for using an outside micrometer.
  - Explain how to read an outside micrometer's scale.
  - Demonstrate the procedure for using an inside micrometer.
  - Demonstrate the procedure for taking measurements with a telescoping gauge.
  - Demonstrate the procedure for using a micrometer depth gauge.
- **Dial Indicators**
  - Describe how to use a dial indicator.
- **Fixed Gauges**
  - Explain how measurements are taken with feeler gauges.
  - Explain how measurements are taken with a taper gauge.
- **Calibration and Care**
  - Describe general procedures for calibrating several prec

Content:

- Vernier Caliper
  - Basics
  - Reading a Vernier Caliper
- Micrometers
  - Outside Micrometers, Inside Micrometers, Telescoping Gauges and Depth Micrometers
- Dial Indicators
- Fixed Gauges
  - Feeler Gauge and Taper Gauge
- Calibration and Care

IHRDC

International Human Resources Development Corporation

HSE

Operations & Maintenance e-Learning

For The Oil And Gas Industry

Air Pollution

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with what air pollution is and how it can be controlled. After completing this unit, trainees should be able to explain what air pollution is, where it comes from, and how it can be monitored. They should also be able to explain how air pollution from industrial facilities can be controlled.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEAP

Objectives:

- **Introduction to Pollution**
  - Explain what air pollution is and how it can be harmful.
  - List two sources of air pollution and name one way in which air pollution is monitored.
  - Give an example of a unit used to measure pollutant concentrations in the air.
- **Controlling Air Pollution**
  - Describe one way of preventing particulates from getting into the air.
  - Provide a basic description of how a process can be modified to reduce air pollution from gases.
  - Explain how material substitution can reduce air pollution.
  - Identify four devices that can be used to remove particulates from a stream of exhaust of air or gases.
  - Explain how an electrostatic precipitator can capture particulates and remove them from a stream of exhaust gases.
  - Give a basic description of a method to capture a potentially polluting vapor for reuse in a process.
  - Name two ways to destroy waste gases.

Content:

- Introduction to Pollution
  - What is Pollution?
  - Sources of Air Pollution
- Controlling Air Pollution
  - Prevention
  - Removal of Particulates
  - Removal of Gases

Pollution Control in Plants

Description:

Trainees are introduced to plant safety concepts through a discussion of how a combination of plant procedures and common sense are used to protect operators on the job. They are also introduced to potential pollution problems in a power plant and the equipment used to deal with these potential problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOOSP

Objectives:

- **Plant Safety**
  - Describe some of the basic protective equipment that operators commonly use.
  - Describe how a tagging system is used to provide protection to personnel working on plant equipment.
- **Pollution Control**
  - Identify a source of air pollution in a power plant.
  - Describe some of the techniques used to control air pollution released by a plant.
  - Identify a source of thermal pollution in a power plant.
  - Describe operator responsibilities for monitoring thermal pollution leaving the plant.
  - Identify a major source of water pollution in a power plant.
  - Describe operator responsibilities for monitoring wastewater leaving the plant.
  - Describe some of the equipment that can be used to minimize the effects of noise pollution.

Content:

- Plant Safety
  - Personal Protection
  - Plant Safety
- Pollution Control
  - Air Pollution
  - Thermal Pollution
  - Water Pollution
  - Noise Pollution

Water Pollution and Waste Disposal

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of preventing pollutants from getting into plant wastewater and removing pollutants from plant wastewater before the water is released into the environment. Also covered are methods of waste disposal and general considerations associated with hazardous wastes. After completing this unit, trainees should be able to identify sources of water pollution and explain how pollutants are kept out of plant wastewater. They should also be able to describe wastewater treatment methods and waste disposal methods.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEWP

Objectives:

- **Introduction to Water Pollution**
  - List two sources of water pollution.
  - Name one way that water pollution is monitored.
  - Name a unit used to measure pollutant concentrations in water.
  - List two ways to keep pollutants from getting into wastewater.
  - Explain the purpose of a retention pond.
- **Wastewater Treatment**
  - Explain why removing inorganic chemicals from wastewater requires flocculation and settling.
  - List how bacteria use oxygen to break down organic chemicals.
  - Describe a typical organic waste treatment facility that includes biological (bacterial) treatment.
  - Explain what happens in anthracite and activated carbon filters used to remove organic chemicals from wastewater.
  - Describe the flow of air and water through a typical cooling tower.
- **Waste Disposal**
  - List two ways of disposing of wastes.
  - List why hazardous wa

Content:

- Introduction to Water Pollution
  - Sources of Water Pollution and Containment
- Wastewater Treatment
  - Treatment Methods
  - Filters and Cooling Towers
- Waste Disposal
  - Disposal and Hazardous Waste

Introduction to Hazardous Waste Operations

Description:

The purpose of this unit is to give trainees a general understanding of what "HAZWOPER" means, the purpose of the OSHA HAZWOPER Standard, and the requirements associated with safety and health training and medical surveillance. At the conclusion of this unit, trainees will know what "HAZWOPER" means and the purpose of the OSHA HAZWOPER Standard. They will also have a general understanding of chemical hazards, control measures, and the basic requirements of emergency response training.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBWOP

Objectives:

- **What is HAZWOPER?**
  - Explain what "HAZWOPER" means and explain the purpose of the OSHA HAZWOPER Standard.
  - List the two general areas of information contained in the Safety and Health Plan as required by HAZWOPER.
  - List the two general goals of the safety and health training program.
  - Explain the purpose of the HAZWOPER medical surveillance program.
- **Chemical Hazards**
  - List the two general types of chemical hazards and describe the risks associated with each type.
  - Describe the four routes of chemical exposure.
- **Control Measures**
  - List three general types of control measures to reduce exposure to hazardous chemicals.
  - Describe the four levels of personal protective equipment.
- **Emergency Response**
  - List the five levels of emergency response training and describe the general requirements of each level.

Content:

- What is HAZWOPER?
  - What "HAZWOPER" Means
  - Safety and Health Program
  - Training
  - Medical Surveillance
- Chemical Hazards
  - Physical Hazards and Health Hazards
  - Routes of Exposure
- Control Measures
  - Engineering Controls and Work Practices
  - Personal Protective Equipment
- Emergency Response
  - Emergency Response Training

Hazard Communication

Description:

The purpose of this unit is to provide trainees with a basic understanding of what hazard communication is and how to use it. At the conclusion of this unit, trainees will have a general understanding of the types of hazards associated with hazardous substances, safety guidelines that reduce the risks of working with hazardous substances, and various ways to obtain information about hazardous substances.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBHAC

Objectives:

- **Types of Hazards**
  - Define the term "physical hazard" and identify examples of physical hazards.
  - Define the term "health hazard" and identify examples of health hazards.
  - Define the terms "acute effects" and "chronic effects," and identify examples of each.
- **Operations and Emergency Response**
  - Describe information that should be included in a facility's standard operating procedures for working with hazardous substances.
  - Describe information that should be included in a facility's emergency response plan.
- **Warning Labels**
  - Describe labeling requirements for hazardous substances in the workplace.
  - Explain what the colors, numbers, and symbols represent on an NFPA fire diamond.
  - Explain what the colors, numbers, and symbols represent on an HMIS label.
- **Material Safety Data Sheets**
  - Describe information th

Content:

- Types of Hazards
  - Physical Hazards, and Health Hazards
  - Acute Effects and Chronic Effects
- Operations and Emergency Response
  - Standard Operating Procedures and Emergency Response Plan
- Warning Labels
  - Labeling Requirements
  - NFPA Fire Diamond
  - HMIS Labels
- Material Safety Data Sheets
  - Types of Information
- Written Training Plan
  - Requirements and Types of Information

Hazardous Waste First Responder - Awareness

Description:

The purpose of this unit is to provide trainees with a general understanding of what hazardous materials are and how to respond to a hazardous materials emergency. At the conclusion of this unit, trainees will have a basic understanding of what hazardous materials are, how hazardous materials can be identified, and what to do if they are first on the scene of a hazardous materials incident.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBHFR

Objectives:

- **Hazardous Materials**
  - Explain what hazardous materials are.
  - List the two general types of hazards associated with hazardous materials and describe the general risks associated with each type.
- **Hazardous Materials Emergencies**
  - Describe some of the potential outcomes of an emergency when hazardous materials are present.
- **Identifying Hazardous Materials**
  - List some ways that the presence of hazardous materials can be recognized.
  - List some ways that hazardous materials can be identified.
- **First on the Scene**
  - Describe some general procedures to follow if you are first on the scene of a hazardous materials incident.
  - Describe some roles that a first responder "Awareness Level" may be required to fill in a hazardous materials emergency.
  - Describe the general contents of the DOT Emergency Response Guidebook.

Content:

- Hazardous Materials
  - What is a HAZMAT?
  - Physical Hazards and Health Hazards
- Hazardous Materials Emergencies
  - Fire and Explosion Hazards and Hazards Not Directly Related to Chemical Hazards
  - Corrosive Materials and Toxic Materials
- Identifying Hazardous Materials
  - Recognizing and Identifying Hazardous Materials Hazardous Materials
- First on the Scene
  - First on the Scene - What to Do
  - The Roles of a First Responder and the DOT Emergency Response Guidebook

Emission Controls

Description:

One of the critical concerns of industries that deal with hazardous chemicals is the release or discharge of these substances into the air. This course identifies different types of emissions and their effects on the environment and describes methods that can be used to prevent or control emissions.

Duration:
1 hour

Course Code:
IHRDC_OM_OTEMC

Objectives:

- **Air Pollution**
  - Define the terms emissions and air pollution.
  - Describe various forms of emissions and their sources.
  - Describe ways that emission levels can be monitored.
- **Emission Prevention and Controls**
  - Describe how emissions can be reduced at the source.
  - Describe how vapor recovery and condensation can prevent emissions from reaching the environment.
- **Scrubbers**
  - Describe the basic operation of a wet scrubber.
  - Describe the operation of a gas scrubber system.
  - Describe operator responsibilities associated with gas scrubber systems.
- **Carbon Absorption**
  - Describe the operation of a fixed-bed carbon adsorption system.
  - Describe the operation of a regenerable fixed-bed system.
- **Particulate Control**
  - Describe the

Content:

- Air Pollution
  - Emissions and Air Pollution
  - Forms of Emissions; Monitoring Emission Levels
- Emission Prevention and Controls
  - Reducing Emissions; Vapor Recovery and Condensation
- Scrubbers
  - Wet Scrubber and Gas Scrubber System
- Carbon Absorption
  - Fixed-bed Carbon Adsorption and Regenerable Fixed-bed System
- Particulate Control
  - Cyclone, Baghouse and Electrostatic Precipitator
- Incineration
  - Incinerator Fundamentals

Wastewater 1

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with treating industrial wastewater to prepare it for safe discharge and reuse. After completing this unit, trainees should be able to describe processes and equipment typically used for wastewater collection and primary treatment, describe the use of chemical precipitation and dissolved air flotation in intermediate treatment, and describe the use of activated sludge in secondary treatment.

Duration:

2 hours

Course Code:

IHRDC_OM_AOWT1

Objectives:

- **Primary Treatment**
  - Explain what wastewater is, where it comes from, and why it must be treated.
  - Define the following terms: sewer, sewage, and effluent.
  - Describe processes and equipment typically used in wastewater collection and primary treatment.
  - Explain why the pH of water may have to be adjusted.
  - Describe the process of clarification and explain how an upflow clarifier works.
- **Intermediate Treatment**
  - Describe how clarification is used with chemical precipitation to remove some types of dissolved materials.
  - Describe the principles of operation for dissolved air flotation.
- **Secondary Treatment**
  - Define the following terms: micro-organisms, return activated sludge, waste activated sludge, and mixed liquor.
  - Describe the activated sludge process.
  - Explain the basic requirements that must be met in order for micro-organisms

Content:

- Primary Treatment
  - Introduction to Wastewater
  - Wastewater Flow and Screening
  - Equalization and pH Adjustment
  - Clarification
- Intermediate Treatment
  - Chemical Precipitation
  - Dissolved Air Flotation
- Secondary Treatment
  - The Activated Sludge Process and Sludge Handling

Wastewater 2

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with treating industrial wastewater so that it can be safely reused or discharged into the environment. After completing this unit, trainees should be able to describe how filtration and activated carbon adsorption can be used in tertiary treatment, and how final effluent quality standards affect the discharge of wastewater from an industrial facility. They should also be able to describe general operator responsibilities associated with wastewater treatment and specific operator responsibilities associated with activated sludge systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOWT2

Objectives:

- **Tertiary Treatment**
  - Explain how filtration can be used in tertiary treatment.
  - Explain how activated carbon adsorption can be used in tertiary treatment.
  - Describe how established quality standards affect the discharge of wastewater from an industrial facility.
- **Operator Responsibilities**
  - Describe tasks that an operator routinely performs to make sure that equipment used in wastewater treatment is functioning properly.
  - Describe the purpose of sampling and analysis programs for wastewater treatment units.
  - Describe the role of safety in wastewater treatment unit operations.
  - Identify process variables that operators monitor and adjust when operating wastewater treatment systems.
  - Define the following terms: sludge blanket level, biochemical oxygen demand, food to micro-organisms ratio, mean cell residence time, and shock.

Content:

- Tertiary Treatment
  - Filtration and Activated Carbon Adsorption
  - Final Effluent Quality Standards
- Operator Responsibilities
  - General Responsibilities
  - Secondary Treatment Responsibilities

Water for Plant Systems 1

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with primary water treatment and chlorination. After completing this unit, trainees should be able to describe problems that can be caused by impurities in the water used in plant systems and explain how some of these impurities can be removed by screens, clarifiers, and filters. They should also be able to explain why and how chlorine is used in water treatment.

Duration:

2 hours

Course Code:

IHRDC_OM_AOWW1

Objectives:

- **Primary Water Treatment**
  - Describe primary and secondary water treatment and the uses of water after each treatment.
  - Describe problems with plant equipment that can be caused by dissolved solids, dissolved gases, and suspended solids.
  - Describe organic and inorganic suspended solids.
  - Describe the function and operation of screens.
  - Describe the function and operation of clarifiers.
  - Describe the coagulation, flocculation, and settling stages of clarification.
  - Describe the function and operation of filters.
- **Chlorination**
  - Describe some of the effects that micro-organisms can have on plant equipment.
  - Describe the functions and operation of a typical chlorine evaporator and a typical chlorinator.
  - Describe safety precautions associated with operations involving chlorine.

Content:

- Primary Water Treatment
  - Introduction
  - Screens
  - Clarifiers
  - Filters
- Chlorination
  - Micro-Organisms
  - Chlorine Addition Equipment
  - Safety Precautions

Water for Plant Systems 2

Description:

This interactive training unit is designed to familiarize trainees with the process of removing dissolved solids and gases from water, and with the safe use of chemicals in water treatment. After completing this unit, trainees should be able to describe ways in which dissolved solids and gases can cause problems in plant equipment. They should also be able to describe how these impurities can be removed by devices such as water softeners, demineralizers, activated carbon filters, aerators, and de-aerators. In addition, trainees should be able to explain how chemicals are used in water treatment and identify safety precautions for the use of chemicals.

Duration:

2 hours

Course Code:

IHRDC_OM_AOWW2

Objectives:

- **Dissolved Solids Removal**
  - Describe ways in which dissolved solids can cause problems in plant equipment.
  - Describe the general function and operation of a water softener.
  - Describe the general function and operation of a demineralizer.
- **Dissolved Gas Removal**
  - Describe ways in which dissolved gases can cause problems in plant equipment.
  - Describe how gases such as oxygen, carbon dioxide, and hydrogen sulfide become dissolved in water.
  - Describe ways that corrosion can be prevented or controlled.
  - Describe the general function and operation of an activated carbon filter.
  - Describe the general function and operation of an aerator.
  - Describe the general function and operation of a de-aerator.
- **Chemical Treatment**
  - Describe how corrosion inhibitors, scale inhibitors, and other chemicals are used in treating water.
  - Describe the

Content:

- Dissolved Solids Removal
  - Dissolved Solids
  - Water Softeners
  - Demineralizers
- Dissolved Gas Removal
  - Dissolved Gases
  - Carbon Filters
  - Aerators
  - De-aerators
- Chemical Treatment
  - Chemicals in Water Treatment
  - Chemical Safety

Chemical Health Hazards

Description:

This interactive training unit is designed to familiarize trainees with chemical health hazards that might be present in the workplace. After completing this unit, trainees should be able to identify various types of physical hazards and health hazards associated with chemicals and describe how they can protect themselves from those hazards.

Duration:

2 hours

Course Code:

IHRDC_OM_AMSHS

Objectives:

- **Identification**
  - Define the terms physical hazard and health hazard and identify examples of each.
  - Define the term route of entry and describe three examples.
  - Define the terms acute effects and chronic effects and describe examples of each.
  - Describe information that is provided on Material Safety Data Sheets.
  - Explain what the colors and numbers represent in the NFPA fire diamond.
  - Explain what the colors and numbers represent in the HMIS labeling system.
  - Explain what the colors and numbers represent in the DOT labeling system.
- **Protection**
  - Describe two types of respirators.
  - Describe how to determine if a respirator is in safe working condition.
  - Describe how to properly select and use goggles.
  - Describe how to properly select and use chemical-resistant clothing.
  - Describe two properties of a chemical that can indicate a hazardous situation.
  - Describe

Content:

- Identification
  - Types of Hazards
  - Documents and Labels
- Protection
  - Respirators
  - Clothing and Equipment
  - Emergency Response

Safety Data Sheets (SDS)

Description:

A Safety Data Sheet (SDS) contains important information about working safely with hazardous chemical products and preventing exposure to them. This course covers the different sections of an SDS to help you become familiar with its format and understand its contents.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBSDS

Objectives:

- Describe the purpose of an SDS.
- Compare SDSs with Material Safety Data Sheets (MSDSs).
- List the benefits of an SDS.
- Name the headings of sections 1 through 8 of an SDS.
- List some of the information found in sections 1 through 8 of an SDS.
- Name the headings of sections 9 through 16 of an SDS.
- List some of the information found in sections 9 through 16 of an SDS.

Content:

- Introduction to Safety Data Sheets
- SDS Sections 1-8
- SDS Sections 9-16

Globally Harmonized System Overview

Description:

The Globally Harmonized System for the Classification and Labelling of Chemicals (GHS) was developed by the United Nations in an effort to better align regulations and standards governing the handling and transport of hazardous materials across different countries. Several U.S. agencies, including the Occupational Safety and Health Administration (OSHA) and the U.S. Department of Transportation (DOT), have incorporated key elements of the GHS into their regulations. These updates have brought noticeable changes to how hazards may be defined, classified, handled, and communicated, specifically with regard to safety labels and safety data sheets.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBGHS

Objectives:

- Discuss the background of the GHS.
- Explain the need for the GHS.
- Describe the benefits of the GHS.
- Discuss the application and adoption of the GHS.

Content:

- GHS History & Application
- Hazard Classification
- Labels
- Safety Data Sheets

Bloodborne Pathogens

Description:

The purpose of this unit is to give trainees a general understanding of hazards associated with exposure to blood in the workplace and basic methods to help minimize exposure. At the conclusion of this unit, trainees will have a basic understanding of the potential hazards of exposure to blood, how to minimize the risk of exposure, and basic principles of the OSHA bloodborne pathogen standard.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBBPA

Objectives:

- **Blood as a Hazardous Material**
  - Explain what bloodborne pathogens are.
  - Describe the general effects of exposure to the HIV virus.
  - Describe the general effects of exposure to the HBV virus.
- **The Risks of Occupational Exposure**
  - List some job categories in the healthcare industry that are potentially at risk for exposure to bloodborne pathogens.
  - List some job categories outside the healthcare industry that are potentially at risk for exposure to bloodborne pathogens.
  - Describe some situations that are not directly related to a job where someone might be at risk for exposure to bloodborne pathogens.
- **Minimizing the Risk of Occupational Exposure**
  - Describe the four routes of exposure for bloodborne pathogens, and describe some ways to protect yourself from exposure through each route of exposure.
- **The OSHA Bloodborne Pathogens S**

Content:

- Blood as a Hazardous Material
  - What are Bloodborne Pathogens?
  - HIV
  - HBV
- The Risks of Occupational Exposure
  - Healthcare Industry
  - General Industry
  - Other Exposure Risks
  - Minimizing the Risk of Occupational Exposure
  - Routes of Exposure
  - Personal Protection
  - Other Protective Measures
- The OSHA Bloodborne Pathogens Standard
  - General Requirements
  - Exposure Control Plan
  - Exposure Incident

Hearing Conservation

Description:

The purpose of this unit is to give trainees a basic understanding of how to protect themselves from hazardous levels of noise in the workplace. At the conclusion of this unit, trainees will have a general understanding of when noise levels are hazardous, the basic requirements of the OSHA regulation on hearing conservation, and devices that are used to provide hearing protection.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBHCO

Objectives:

- **Hazardous Noise Levels**
  - Define the following terms: sound, sound wave, and noise
  - Describe two properties of sound waves: intensity and frequency
- **OSHA Standard**
  - Describe the OSHA regulations for hearing conservation.
- **Hearing Protection Equipment**
  - Describe how ear plugs and earmuffs provide hearing protection.

Content:

- Hazardous Noise Levels
  - Sound, Sound Waves and Noise
  - Action Level
- OSHA Standard
  - Requirements
  - Hearing Conservation Program and Hearing Tests
- Hearing Protection Equipment
  - Ear Plugs and Ear Muffs
  - Noise Reduction Rating

Workplace Ergonomics

Description:

The purpose of this unit is to give trainees a general understanding of ergonomics in the workplace. At the conclusion of this unit, trainees will have a basic understanding of how ergonomics can prevent MSDs; be able to identify ergonomic risk factors and work activities associated with MSD hazards; describe some common MSDs, including their signs and symptoms and the importance of reporting them early; and describe the actions that they can take to control ergonomic hazards.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBWPE

Objectives:

- **Ergonomics Basics**
  - Describe musculoskeletal disorders.
  - Explain the term "ergonomics."
- **Ergonomic Risk Factors**
  - Describe ergonomic risk factors associated with MSDs.
  - Describe work activities that involve ergonomic risk factors.
- **Common MSDs**
  - Describe common MSDs.
  - Explain the importance of reporting signs and symptoms early.
- **Controlling Ergonomic Hazards**
  - Explain what a job hazard analysis is.
  - Describe some things you can do to reduce MSD hazards.
  - Raynaud's Phenomenon
  - Recognize Signs and Symptoms of MSDs

Content:

- Ergonomics Basics
  - Musculoskeletal Disorders and Ergonomics Explained
- Ergonomic Risk Factors
  - Awkward Postures, Force, Repetition and Contact Stress
  - Vibration, Static Postures and Cold Temperatures
  - Multiple Risk Factors
- Common MSDs
  - Tendinitis and Tenosynovitis, Carpal Tunnel Syndrome, Epicondylitis
  - Shoulder and Neck Pain, Low Back Pain, Raynaud's Phenomenon
  - Recognize Signs and Symptoms of MSDs
- Controlling Ergonomic Hazards
  - Job Hazard Analysis and Things You Can Do to Reduce Ergonomic Hazards

ISO 9000

Description:

The European Community (EC) is a single trading bloc including many countries in Europe. The International Organization for Standardization (ISO) is an organization working with the EC and other countries to develop worldwide standards for products and services. The series of quality system standards and guidelines is commonly called ISO 9000. The focus of this course will provide examples showing how process plant operations can be modified to comply with ISO 9000.

Duration:
30 minutes

Course Code:
IHRDC_OM_OTISO

Objectives:

- **Overview**
  - Describe the basic purpose of ISO 9000.
  - Describe the role ISO 9000 plays on marketing, purchasing, and documentation.
  - Identify four production areas covered under ISO 9000.
  - Explain what quality records, audits, and training requirements are under ISO 9000
- **Corrective Actions**
  - List actions taken for nonconforming material.
  - Describe four basic steps in a typical corrective action process.

Content:

- Introduction
- Marketing, Purchasing, and Documentation
- Production
- Test Equipment and Statistical Methods
- Nonconformance and Corrective Action
- Quality Records, Quality Audits, and Training

Safety Basics

Description:

This interactive training unit is designed to familiarize trainees with hazards they may encounter on the job, and ways in which they can protect themselves from these hazards. After completing this unit, trainees should be able to describe causes of on-the-job accidents, explain how company safety policies can help prevent accidents, describe actions that can be taken to make a work site safe, and explain how workers can protect themselves from electrical hazards and fire hazards.

Duration:

2 hours

Course Code:

IHRDC_OM_AMSBA

Objectives:

- **Preventing Accidents**
  - Describe causes of on-the-job accidents.
  - Explain how good housekeeping can prevent accidents.
  - Explain why it is important to follow all company safety policies.
  - Explain why it is important to report on-the-job injuries, accidents, and near misses.
  - Explain why it is important for workers to know and follow company evacuation procedures.
- **Work Site Safety**
  - Describe typical personal protective equipment, and explain when and why each type of equipment is used.
  - Describe how to inspect and care for personal protective equipment.
  - Describe safe procedures for lifting heavy objects.
  - Describe common workplace hazards.
  - Describe rules and guidelines for general work site safety.
  - Describe safety requirements for working in confined spaces.
  - Describe safe practices for operating or working near motorized vehicles.
  - Describe safe lockout/t

Content:

- Preventing Accidents
  - Accidents; Safety Policies
- Work Site Safety
  - Personal Protection; Safe Work Practices
- Equipment and Materials
  - Ladders and Scaffolds
  - Electrical and Fire Safety

Safety Fundamentals in Power Plants

Description:

This interactive training unit is designed to familiarize trainees with various types of hazards that may exist in a power plant. After completing this unit, the trainees should be able to identify common types of mechanical and electrical hazards, temperature and pressure hazards, and fire and chemical hazards. They should also be able to describe devices and techniques that can be used to prevent or minimize these hazards.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPF

Objectives:

- **Mechanical & Electrical**
  - Describe conditions that commonly lead to material and equipment failure.
  - Identify ways to detect equipment failure.
  - Describe common electrical hazards in a power plant.
  - Identify devices used to prevent or minimize electrical hazards.
- **Temperature & Pressure**
  - Identify devices used to prevent abnormal temperature conditions.
  - Identify devices used to prevent abnormal pressure conditions.
- **Chemical & Fire**
  - Identify common chemical hazards in a power plant
  - Identify ways to prevent chemical hazards.
  - Describe fire protection systems commonly found in power plants.

Content:

- Mechanical & Electrical
  - Equipment Failure
  - Electrical Hazards
- Temperature & Pressure
  - Abnormal Temperature
  - Abnormal Pressure
  - Chemical & Fire
  - Chemical Hazards
  - Fire Protection

Safety Orientation

Description:

The purpose of this unit is to provide trainees with a brief overview of common safety issues that are associated with safety in the workplace.
At the conclusion of this unit, trainees with have a general understanding of workplace safety issues that are associated with safe work habits, personal protective equipment, hazard communication, and fire prevention.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBSOR

Objectives:

- **Safe Work Habits**
  - Define fitness for duty and identify conditions that can affect a worker's fitness for duty.
  - Describe good housekeeping practices that are associated with workplace safety.
  - Describe safety concerns and procedures that are associated with the proper use of tools.
  - Describe safety concerns and procedures that are associated with the energy sources that are used to operate industrial equipment.
- **Personal Protective Equipment**
  - Identify and describe basic types of personal protective equipment that are commonly required for workplace safety.
  - Identify and describe common types of personal protective equipment that may be required for special hazards.
- **Hazard Communication**
  - Describe the types of information that may be obtained from Material Safety Data Sheets.
  - Describe common types of warning signs, tags, and labels that may

Content:

- Safe Work Habits
  - Fitness for Duty
  - Housekeeping
  - Tool Use
  - Energy Sources
- Personal Protective Equipment
  - Basic Types
  - Specialized Types
- Hazard Communication
  - Material Safety Data Sheets
  - Warning Signs, Tags, and Labels
  - Introduction to HAZWOPER
- Fire Prevention
  - Fire Safety
  - Classes of Fire Extinguishers

Introduction to Electrical Safety

Description:

The purpose of this unit is to give trainees a general understanding of basic principles of electricity and electrical safety. At the conclusion of this unit, trainees will have a basic understanding of various aspects of working safely around electrical equipment

Duration:

2 hours

Course Code:

IHRDC_OM_AMSEL

Objectives:

- **Electrical Concepts**
  - Describe the basic electrical quantities of current, voltage, and resistance.
- **Shock**
  - State what an electrical shock is.
  - Describe factors that affect the severity of an electrical shock.
  - Describe the physical effects of current passing through the human body.
- **Hazards**
  - Describe hazards associated with working near electrical equipment.
- **Protection**
  - Describe ways of providing protection to personnel from hazards associated with electricity.
- **Emergencies**
  - Describe how to safely give aid to an electrical shock victim.
  - Describe how to safely respond to an electrical fire.

Content:

- Electrical Concepts
  - Friend or Foe?; Current; Voltage
  - Resistance
- Shock
  - What Is Shock?
  - Amount of Current, Length of Time
  - Path Through the Body and Effects
- Hazards
  - High Voltage Area, Overloaded Circuits, Damaged Cords
  - Bare Connectors, Long and Tall Objects, Mobile Equipment, Standing Water

Advanced Electrical Safety

Description:

The purpose of this unit is to give trainees a general understanding of basic principles of electricity and electrical safety. At the conclusion of this unit, trainees will have a basic understanding of various aspects of working safely around electrical equipment.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBESA

Objectives:

- **Electrical Safety**
  - Describe the basic electrical quantities of current, voltage and resistance.
- **Shock**
  - State what an electrical shock is.
  - Describe factors that affect the severity of an electrical shock.
  - Describe the physical effects of current passing through the human body.
- **Hazards**
  - Describe hazards associated with working near electrical equipment.
- **Protection**
  - Describe ways of providing protection to personnel from hazards associated with electricity.
- **Emergencies**
  - Describe how to safely give aid to an electrical shock victim.
  - Describe how to safely respond to an electrical fire.

Content:

- Electrical Concepts
  - Friend or Foe?; Current; Voltage; Resistance
- Shock
  - What is Shock?
  - Amount of Current, Length of Time
  - Path Through the Body, Effects
- Hazards
  - High Voltage Area, Overloaded Circuits, Damaged Cords
  - Bare Connectors, Long & Tail Objects, Mobile Equipment, Standing Water
- Protection
  - Warning Tape, Signs, Locks and Tags
  - Compressed Air and Battery Powered Tools
  - Proper Grounding
- Emergencies
  - Electrical Shock Victim; Electrical Fire

Electrostatic Discharge Precautions

Description:

This course covers the principles of electrostatic discharge and the necessary precautions that should be taken to avoid damage to sensitive equipment.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELESD

Objectives:

- **Overview**
  - Indicate material susceptible to triboelectric charging.
  - Explain how material characteristics affect static charge.
  - Explain why ESD damage occurs bi-directionally.
- **Controls and Prevention**
  - Identify static control testing and preparation.
  - Identify how ESD, or electrostatic discharge, causes immediate and latent damage.

Content:

- Overview
  - Material susceptible to triboelectric charging
  - How material characteristics affect static charge
  - Why ESD damage occurs bi-directionally
- Controls and Prevention
  - Static control testing and preparation.
  - How ESD, or electrostatic discharge, causes immediate and latent damage

Classes of Fires and Extinguishers

Description:

The purpose of this unit is to give trainees a general understanding of basic principles of fire, types of fire extinguishers, and how to identify different types of fire extinguishers.
At the conclusion of this unit, trainees will have a basic understanding of three elements of combustion, four classes of fires, common types of fire extinguishers and extinguishing agents, and ways of identifying different types of fire extinguishers.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBCOF

Objectives:

- **Fire Basics**
  - Name three elements of combustion.
  - Describe the four classes of fires.
- **Extinguishers & Extinguishing Agents**
  - Describe common types of fire extinguishers and extinguishing agents.
- **Extinguisher Identification**
  - Describe several ways of identifying different types of fire extinguishers.

Content:

- Fire Basics
  - Elements of Combustion
  - Classes of Fires
- Extinguishers & Extinguishing Agents
  - Water
  - Multipurpose Dry Chemicals
  - Carbon Dioxide
  - Foam
  - Class D Agents
- Extinguisher Identification
  - Identification
  - Symbols
  - Pictures

Fire Safety

Description:

The purpose of this unit is to give trainees a general understanding of basic principles associated with fire, fire prevention, and managing fire situations.
At the conclusion of this unit, trainees will have a basic understanding of how fires start, general categories of fire prevention methods, common workplace evacuation procedures, and how to select and use common types of portable fire extinguishing equipment.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBFSA

Objectives:

- **How Fires Start**
  - Explain how fires start.
- **Preventing Fires**
  - Describe two general categories of fire prevention methods and list examples of each.
- **Managing Fire Situations**
  - Describe some common workplace evacuation procedures.
  - Explain how to select and use common types of portable fire extinguishing equipment.

Content:

- How Fires Start
  - Basic Elements of Fire and Igniting a Fire
- Preventing Fires
  - Controlling Sources of Heat and Fuel
- Managing Fire Situations
  - Evacuation Procedures; Emergency and Fire Prevention Plans
  - Fire Types and Fire Extinguishers
  - Using a Fire Extinguisher and a Fire Hose/Standpipe System

Forklift Safety Checks

Description:

The purpose of this unit is to give trainees a general understanding of performing safety checks on a forklift.
At the conclusion of this unit, trainees will have a basic understanding of tasks performed as part of a structural check of a forklift, tasks performed as part of a power system check of a forklift, and tasks that can be performed as part of an operational check of a forklift.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBFSC

Objectives:

- **Structural Checks**
  - Describe tasks that can be performed as part of a structural check of a forklift.
- **Power System Checks**
  - Describe tasks that can be performed as part of a power system check of a forklift.
- **Operational Checks**
  - Describe tasks that can be performed as part of an operational check of a forklift.

Content:

- Structural Checks
  - Preparation; Major Components; Safety Components
- Power System Checks
  - Hydraulic System; Electrical System; Internal Combustion Engines; Propane Gas Cylinders
- Operational Checks
  - Before-Use Checks; During-Use Checks; After-Use Checks

Safe Forklift Operation

Description:

The purpose of this unit is to give trainees a general understanding of various aspects of operating a forklift safely. At the conclusion of this unit, trainees will have a basic understanding of some techniques that are commonly used to maneuver a forklift including some special situations they will probably encounter, traffic safety issues associated with forklift operation, and how to safely handle loads using a forklift.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBSFO

Objectives:

- **Maneuvering a Forklift**
  - Describe how to maneuver a forklift.
- **Traffic Safety**
  - Describe how to drive a forklift to protect yourself, others and property from injury or damage.
- **Handling Loads**
  - Describe general guidelines associated with handling loads safely with a forklift.

Content:

- Maneuvering a Forklift
  - Rear Wheel Steering; Turning a Corner; Turning in an Aisle; Turning Around
  - Entering Trucks/Trailers/Rail Cars; Driving on Slopes; Elevators
- Traffic Safety
  - Personal Preparedness; In Case of a Tipover
  - Pedestrians and Other Vehicles; Obstacles and Hazards
  - Parking a Forklift
- Handling Loads
  - Visual Inspection; Weights of Loads; Preparing to Move a Load
  - Moving a Load; Placing a Load; Disengaging the Forks; Other Considerations

Understanding Forklifts

Description:

The training unit is designed to familiarize trainees with some basic information about forklifts.
After completing this unit, the trainees should be able to describe the various types of forklifts and some differences between forklifts and cars, the standard components of most forklifts, and the principles of forklift safety.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBUFL

Objectives:

- **Forklift Basics**
  - Describe the various types of forklifts.
  - Describe the differences between a forklift and a car.
- **Forklift Components**
  - Describe the basic components of a forklift.
  - Describe a forklift's operating controls and gauges.
- **Principles of Stability**
  - Describe the factors that affect the stability of a forklift.

Content:

- Forklift Basics
  - How Forklifts are Powered
  - Forklift Sizes and Capacities
  - Forklift Attachments
- Forklift Components
  - Major Sections of a Forklift; Forklift Operating Controls
- Principles of Stability
  - Three-Point Suspension Systems; Center of Gravity; Load Center

Introduction to Laboratory Safety

Description:

The purpose of this unit is to give trainees a general understanding of basic principles of safety in a laboratory setting.
At the conclusion of this unit, trainees will have a basic understanding of general hazards that exist in laboratories, basic personal protection equipment to protect from those hazards, how to locate information about chemicals, basic standard operating procedures and chemical hygiene practices, and how to respond in emergency situations.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBLSA

Objectives:

- **Hazards in the Laboratory**
  - Describe two broad categories of chemical hazards
  - Explain the difference between acute and chronic health effects from chemical exposure.
  - Describe the four routes of chemical exposure.
- **Minimizing the Risks**
  - Describe the four basic principles of safety in the laboratory
  - Describe three main types of personal protective equipment used in the laboratory.
- **The OSHA Lab Standard**
  - State the primary requirements of the OSHA Lab Standard and describe some methods of meeting that requirement.
  - Describe the general requirements of the written Chemical Hygiene Plan and explain some ways those requirements can be met.
- **Chemical Hygiene Practices**
  - Describe some basic chemical hygiene practices that will help minimize exposure to hazardous chemicals in the lab.
- <

Content:

- Hazards in the Laboratory
  - Physical Hazards; Health Hazards; Routes of Exposure
- Minimizing the Risks
  - Four Basic Safety Principles; Personal Protective Equipment
- The OSHA Lab Standard
  - General Requirements; The Chemical Hygiene Plan
- Chemical Hygiene Practices
  - Safety Awareness; Minimizing Exposure
- Chemical Storage
  - General Storage Requirements; Five Classes of Chemicals
- Emergency
  - Emergency Response Plan; Emergency Equipment/In Case of Exposure

The Safe Lab Environment

Description:

This unit provides trainees with an overview of safety considerations for nearly every aspect of laboratory operation. Safety issues regarding lab design and how design features protect lab workers are discussed. The importance of ventilation and the operation of ventilating equipment (such as chemical hoods and biological safety cabinets) are also emphasized. Also detailed are safe practices and precautions associated with the handling and storage of chemicals. The unit also describes various methods for cleaning up chemical spills and the procedures and regulatory concerns for disposing of chemical waste.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTTSA

Objectives:

- **Safety Design Features**
  - Describe design features that help to provide a safe lab environment.
- **Ventilation**
  - Explain how general ventilation is accomplished in a lab.
  - Describe the function and operation of fume hoods and list some guide-lines that apply to their use.
  - Describe the function and operation of biological safety cabinets.
- **Chemical Storage**
  - Describe safe practices associated with the storage of various chemicals in a lab.
- **Handling Spills and Waste Disposal**
  - Describe methods for cleaning up small to moderate chemical spills and disposing of contaminated waste.
  - Describe safety and regulatory concerns associated with the disposal of various forms of chemical waste.

Content:

- Safety Design Features
  - Exits and lighting; Safety systems; Electrical equipment
  - Compressed gas cylinders; Safety equipment
- Ventilation
  - General ventilation; Local ventilation
- Chemical Storage
  - Chemical identification; Chemical compatibility
  - Storing hazardous chemicals and materials
- Handling Spills and Waste Disposal
  - Cleaning up chemical spills; Disposing of chemical waste

Personal Safety for Lab Technicians

Description:

This unit covers the nature of various laboratory hazards and the precautions and safety procedures technicians must practice to protect themselves while working in the laboratory environment. Specifically, this unit looks at the hazards presented by chemicals, equipment, and microorganisms. Protective clothing and equipment as well as safe work procedures for preventing exposure and contamination are described. Practical information on detecting and treating chemical exposures and properly dealing with emergencies is also given. Housekeeping responsibilities and personal hygiene are presented as ways of promoting personal safety.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTPES

Objectives:

- **Laboratory Hazards**
  - Describe chemical hazards that may be found in a laboratory.
  - Describe equipment hazards that may be found in a laboratory.
  - Describe microbiological hazards that may be found in a laboratory.
- **Preventing Exposure and Contamination**
  - Describe how various types of protective clothing and equipment can protect lab workers from exposure and help prevent contamination.
- **Emergencies and Training**
  - Describe equipment that is typically available in a lab for responding to emergencies.
  - Describe the purpose and content of typical lab emergency procedures.
  - Describe information that is typically covered in lab safety training.
- **Housekeeping and Personal Hygiene**
  - Describe some examples of housekeeping rules that are necessary to maintain personal safety.

Content:

- Laboratory Hazards
  - Chemical hazards; Equipment hazards; Microbiological hazards
- Preventing Exposure and Contamination
  - Eye protection; Gloves; Clothing and footwear; Respiratory protection
- Recognizing and Treating Exposure
  - Routes of chemical exposures; Effects of chemical exposures
  - Detecting chemical exposures; Treating chemical exposures
- Emergencies and Training
  - Emergency equipment; Emergency procedures; Lab safety training
- Housekeeping and Personal Hygiene
  - Good housekeeping; Personal hygiene

Tank Trucks

Description:

This interactive training unit is designed to familiarize trainees with basic concepts of material handling using tank trucks. After completing this unit, trainees should be able to describe characteristics of liquids that can affect liquid handling operations. They should also be able to describe precautions, procedures, and equipment associated with handling hazardous liquids. Trainees should also be able to describe features of a typical tank truck and typical procedures for its loading and unloading.

Duration:
2 hours

Course Code:
IHRDC_OM_AOMTT

Objectives:

- **General Concerns**
  - Explain how toxicity, viscosity, volatility, temperature, and pressure can affect liquid handling operations.
  - Describe how static electricity can affect the handling of bulk liquids.
  - Describe how operators can identify hazardous materials.
  - Identify precautions, procedures, and equipment associated with handling hazardous chemicals.
- **Loading and Unloading**
  - Describe the major features of a typical tank truck.
  - Identify associated equipment used with tanks during liquid transfers.
  - Identify equipment commonly associated with tank trucks.
  - Identify methods of transferring bulk liquids.
  - Describe the basic tasks involved in transferring bulk liquids.
  - Identify items that should be checked during pre-transfer and post-transfer inspections.
  - Describe typical procedures for top-loading a tank truck.
  - Describe how bottom-loading a tank truck differ

Content:

- General Concerns
  - Characteristics of Liquids; Handling Hazardous Materials
- Loading and Unloading
  - Tank Truck Features; Loading a Tank Truck; Unloading a Tank Truck

Transporting Hazardous Materials

Description:

The purpose of this unit is to give trainees a general understanding of the requirements associated with transporting hazardous materials.
At the conclusion of this unit, trainees will have a basic understanding of how hazardous materials and their containers are prepared for transport, what types of documentation are required, and how hazardous materials are identified according to DOT requirements.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBTHM

Objectives:

- **Classifications**
  - Define the term "hazardous materials," and identify the Department of Transportation regulations that control the shipment of these materials.
  - Identify and describe the different classes of hazardous materials.
  - Identify and describe terms and symbols used to identify hazardous materials.
- **Documentation and Packaging**
  - Describe documentation that is needed to transport hazardous materials.
  - Describe types of packaging used to transport hazardous materials.
  - Describe markings used to identify hazardous materials contained in packaging.
- **Labels and Placarding**
  - Identify and describe labels and placarding used to identify hazardous materials.

Content:

- Classifications
  - What are Hazardous Materials?; Classes of Hazardous Materials; Terms and Symbols
- Documentation and Packaging
  - Documentation; Packaging; Labels
- Labels and Placarding
  - Labels

Warning Signs and Labels

Description:

The purpose of this unit is to give trainees a general understanding of the purpose and use of warning signs and various types of labels. At the conclusion of this unit, trainees will have a basic understanding of government regulations that deal with labeling. They will also have a general understanding of the types of information that can be obtained from hazardous product labels, shipping labels and warning signs.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBWSL

Objectives:

- **Overview**
  - Identify government regulations regarding labeling.
- **Hazardous Product Labels**
  - Describe types of information that can be found on hazardous product labels.
- **Shipping Labels**
  - Describe types of information that can be found on DOT shipping labels and markings.
- **Warning Signs**
  - Describe types of information that can be found on warning signs.

Content:

- Overview
  - Resource Conservation and Recovery Act; OSHA Hazard Communication Standard; DOT Regulations
  - Examples of Warning Signs and Labels
- Hazardous Product Labels
  - NFPA Hazard Rating System; HMIS Rating System
- Shipping Labels
  - DOT Shipping Labels and Markings
- Warning Signs
  - Types of Information
- Protection
  - Informing Workers; Preventing Exposure; Preventing Accidental Operation
  - Tools; Equipment; Personal Gear
- Emergencies
  - Aiding a Shock Victim; Fighting an Electrical Fire

Personal Protection Equipment

Description:

The purpose of this unit is to give trainees a general understanding of basic types of personal protection equipment.
At the conclusion of this unit, trainees will have a basic understanding of personal protective clothing and equipment, including respiratory protection and fall protection.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBPPE

Objectives:

- **Protective Clothing**
  - Describe basic clothing that can be worn to protect against job related hazards.
  - Describe types of gloves worn to protect the hands from job related hazards.
  - Describe types of work shoes worn to protect the feet from job related hazards.
- **Protective Equipment**
  - Describe a typical hard hat and other head protection used to protect the head from job related hazards.
  - Describe types and uses of protective equipment commonly used to protect eyesight and hearing.
- **Respiratory Protection**
  - Describe equipment used for respiratory protection.
- **Fall Protection**
  - Describe typical equipment used for fall protection.

Content:

- Protective Clothing
  - Protective Clothing; Wearing Clothing Properly; Protecting Hands and Feet
- Protective Equipment
  - Head Protection; Eye Protection; Hearing Protection
- Respiratory Protection
  - Types of Respirators
- Fall Protection
  - Fall Protection Equipment

Respirator Fit Testing

Description:

The purpose of this unit is to give trainees a general understanding of respirator fit factors and methods for performing basic respirator testing.
At the conclusion of this unit, trainees will understand how to select a respirator of the proper size, and how to perform fit checks and testing to ensure that the respirator will protect the user from airborne contaminants.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBRFT

Objectives:

- **Fittings**
  - Explain how proper respirator fit is determined, and identify factors that may prevent s respirator from properly fitting an individual.
- **Disposable Respirators**
  - Describe how to ensure a proper fit with a disposable filter mask respirator.
- **Fit Checks**
  - Describe basic procedures for performing exhalation and inhalation fit checks.
- **Testing**
  - Describe basic procedures for performing qualitative testing.
  - Describe basic procedures for performing quantitative testing.

Content:

- Fittings
  - Proper Fit; Fitting Factors
- Disposable Respirators
  - Types of Disposable Respirators
  - Selecting the Proper Size; Ensuring the Proper Fit
- Fit Checks
  - Checking General Condition; Positive Pressure Check; Negative Pressure Check
- Testing
  - Qualitative Testing; Quantitative Testing

Respiratory Protection

Description:

The purpose of this unit is to give trainees a general understanding of basic types of respirators and proper methods for the use and care of respirators.
At the conclusion of this unit, trainees will have a basic understanding of air purifying respirators, air supplied respirators, and how to properly use and care for respirators.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBRPR

Objectives:

- **Air Purifying Respirators**
  - Describe what an air purifying respirator is and identify common types of air purifying respirators.
  - Describe a typical disposable filter mask and explain how it can be used.
  - Describe a typical chemical cartridge mask and explain how it can be used.
  - Explain how to choose the proper cartridge for a chemical cartridge respirator.
  - Describe a typical gas mask and explain how it can be used.
- **Air Supplied Respirators**
  - Identify basic types of air supplied respirators.
  - Describe a typical air line respirator and explain how it can be used.
  - Describe a typical self-contained breathing apparatus (SCBA) and explain how it can be used.
  - Describe a typical portable escape respirator and explain how it can be used.
- **Use and Care of Respirators**
  - Identify factors that affect respirator selection.
  - Describe

Content:

- Air Purifying Respirators
  - What is an Air Purifying Respirator?
  - Disposable Filter Masks; Chemical Cartridge, Filter and Canister Masks; Gas Masks
- Air Supplied Respirators
  - What is an Air Supplied Respirator?
  - Types of Air Flow; Air Line Respirators; SCBAs; Portable Escape Respirators
- Use and Care of Respirators
  - Selecting a Respirator; Inspection; Proper Use
  - Cleaning and Disinfecting; Reassembly and Testing

Back Safety

Description:

The purpose of this unit is to provide trainees with a general understanding of how to minimize their chances of sustaining a back injury. At the conclusion of this unit, trainees will know how to maintain good posture as they go about their daily activities, how to safely lift and move loads, and how to perform some simple exercises that are helpful in maintaining a healthy back.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBBBA

Objectives:

- **Posture**
  - Explain what is meant by the term "good posture."
  - Describe techniques for maintaining good posture during various activities.
- **Safe Lifting**
  - Describe the proper technique for lifting and moving an object.
  - Describe proper techniques for carrying a long load, stacking a load, and performing activities that involve twisting or turning.
- **Back Exercises**
  - Describe basic exercises that can be done in an office.
  - Describe basic exercises that can be done at home or at a gym.

Content:

- Posture
  - "Good Posture"; Sitting; Standing
  - Walking and Turning; Reaching Overhead; Picking Up an Object from the Floor
- Safe Lifting
  - "Mental Lifts"; Lifting an Object; Lowering an Object
  - Carrying a Long Load; Stacking a Load; Turning a Valve Wheel
- Back Exercises
  - At the Office; At Home or at the Gym

Confined Space Entry

Description:

The purpose of this unit is to give trainees a basic understanding of confined space hazards and the general requirements of the OSHA Confined Space Standard. At the conclusion of this unit, trainees will know the difference between a confined space and a "permit-required" confined space. They will also have a general understanding of the hazards associated with working in confined spaces and how to protect themselves from these hazards.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBCSE

Objectives:

- **Confined Space Characteristics**
  - Describe the characteristics of a confined space.
  - List some examples of confined spaces.
  - Explain how a "permit-required" confined space differs from one that does not require a permit.
- **Confined Space Hazards**
  - Describe the main types of hazards found in "permit-required" confined spaces.
- **OSHA Confined Space Standard**
  - Describe the general requirements of the OSHA "Permit-Required" Confined Space Standard.
  - Describe the general requirements for a written Permit Space Program.
  - Describe the general requirements of a typical entry permit.
- **Protective Measures**
  - Describe some general protective measures used to protect workers in confined spaces.
- **The Attendant**
  - Describe general responsibilities of the confined space attendant.

Content:

- Confined Space Characteristics
  - Confined Spaces; "Permit-Required" Confined Spaces
- Confined Space Hazards
  - Hazardous Atmospheres; Engulfment Hazard; Configuration Hazard; Other Hazards
- OSHA Confined Space Standard
  - General Requirements; Written Permit Space Program; A Typical Entry Permit
- Protective Measures
  - Preparing the Space; Personal Protective Equipment; Other Safety Equipment
- The Attendant
  - The Attendant's Responsibilities

Driving Safety

Description:

The purpose of this unit is to give trainees a general understanding of driving safety. At the conclusion of this unit, trainees will have a basic understanding of the general circumstances that cause vehicle accidents, the role of defensive driving and space management in preventing accidents, the importance of the mental and physical condition of the driver, and how proper vehicle maintenance and use of the car's safety features can minimize or prevent accidents.

Duration:

45 minutes

Course Code:

IHRDC_OM_BBDRS

Objectives:

- **Understanding Motor Vehicle Accidents**
  - Explain the factors typically involved in motor vehicle accidents.
  - Explain the difference between "not at fault" and "accident-free."
- **Defensive Driving**
  - Explain the terms "defensive driving" and "space management."
  - Discuss specific defensive driving and space management techniques.
- **Condition of the Driver**
  - Explain error-prone states of mind: frustration/anger, rushing, distracted and drowsy.
  - Discuss the role of alcohol in motor vehicle accidents.
- **Vehicle Condition and Safety Features**
  - Discuss the importance of the condition of the vehicle.
  - Discuss safety belts, air bags, and antilock braking systems.

Content:

- Understanding Motor Vehicle Accidents
  - Typical factors in motor vehicle accidents; The difference between "not at fault" and "accident-free"
- Defensive Driving
  - Defensive driving defined; Delayed start; Changing lanes on a highway
  - Space management defined; Managing space in front; Managing space to the side and rear; Space management when not moving
- Condition of the Driver
  - Frustration and anger; Rushing; Distracted; Drowsy; Alcohol
- Vehicle Condition and Safety Features
  - Condition of the vehicle; Safety belts; Air bags; Antilock braking systems

Fall Protection

Description:

The purpose of this unit is to give trainees a general understanding of when fall protection is required and how to select and use a personal fall arrest system. At the conclusion of this unit, trainees will have a basic understanding of conditions in which fall protection is required, how fall protection can be achieved, how to identify the basic parts of a typical fall arrest system, and how to select, use, and care for a personal fall arrest system.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBFPR

Objectives:

- **Introduction**
  - Describe working conditions in which fall protection is required and the purposes served by fall protection.
  - Identify the basic means by which fall protection can be achieved.
  - Identify the major topics that must be covered to provide personnel with adequate fall protection training.
  - Describe the difference between fall prevention and fall arrest.
  - Identify and describe typical equipment used to prevent falls.
- **Fall Protection Equipment**
  - Identify and describe the basic parts of a typical fall arrest system.
- **Selection, Use and Care**
  - Describe the proper selection, use, and care of a personal fall arrest system.

Content:

- Introduction
  - Conditions in Which Fall Protection Is Required
  - Purposes of Fall Protection
  - Basic Means of Achieving Fall Protection
  - Fall Protection Training
  - Fall Prevention and Fall Arrest
- Fall Protection Equipment
  - Parts of a Typical Fall Arrest System
- Selection, Use and Care
  - Selecting a Personal Fall Arrest System
  - Using a Personal Fall Arrest System
  - Caring for a personal Fall Arrest System

Ladders and Scaffolds

Description:

This interactive training unit is designed to familiarize trainees with various types of ladders and scaffolds that enable personnel to work at elevated heights. After completing this unit, trainees should be able to describe how to select the proper ladder for a job and then use the ladder safely. They should also be able to describe general safety precautions associated with using scaffolds, and the basic operation and use of various types of fixed and powered scaffolds.

Duration:

2 hours

Course Code:

IHRDC_OM_AMRLS

Objectives:

- **Ladders**
  - Describe various types of ladders and their ratings.
  - Explain how to select the proper ladder for the job.
  - Explain how to use a ladder safely.
- **Fixed Scaffolds**
  - Describe general safety precautions associated with stationary, or fixed scaffolds.
  - Describe the assembly, use, and disassembly of a systems scaffold.
  - Describe the assembly, use, and disassembly of a tubular welded frame scaffold.
- **Powered Scaffolds**
  - Describe the basic components and operation of a pneumatic scaffold.
  - Describe the basic components and operation of a hydraulic scaffold.

Content:

- Ladders
  - Types of Ladders
  - Ladder Safety
- Fixed Scaffolds
  - Scaffold Safety
  - Systems Scaffolds
  - Tubular Welded Frame Scaffolds
- Powered Scaffolds
  - Pneumatic Scaffolds
  - Hydraulic Scaffolds

Lockout/Tagout

Description:

The purpose of this unit is to give trainees a general understanding of standards governing the control of hazardous energy. At the conclusion of this unit, trainees will have a basic understanding of various aspects of lockout/tagout, including safe lockout/tagout techniques.

Duration:
45 minutes

Course Code:
IHRDC_OM_BBLOT

Objectives:

- **What is Lockout/Tagout?**
  - Define "hazardous energy."
  - Explain why standards governing the control of hazardous energy are necessary. Describe the purpose and scope of the OSHA standard that governs the control of hazardous energy.
- **Hazardous Energy**
  - Identify various types of hazardous energy.
- **Requirements**
  - Identify and describe the basic contents of an energy control program.
  - Describe the protective materials and hardware required by the OSHA energy control standard to perform lockout/tagout.
  - Describe the differences between a lockout and a tagout procedure.
- **Procedures**
  - Describe the basic steps of a typical lockout/tagout procedure.
- **Special Situations**
  - Describe special situations that can occur during lockout/tagout.

Content:

- What is Lockout/Tagout?
  - Accidents; Guidelines; Purpose, Scope and Benefits
- Hazardous Energy
  - Types; Active Energy and Residual Energy; Variations; Effects
- Requirements
  - Energy Control Programs and Procedures; Materials & Hardware
  - Lockout/Tagout Procedures; Training; Inspection
- Procedure
  - Shutdown and Removal of Energy; Applying of Lockout/Tagout Devices
  - Verification of Safe Condition and Preparation for Startup; Removal of Lockout/Tagout Devices and Return to Service
- Special Situations
  - Introduction; Energizing Equipment; Contractors
  - Group Lockout/Tagout; Shift/Personnel Changes

IHRDC

International Human Resources Development Corporation

MAINTENANCE

Operations & Maintenance e-Learning

For The Oil And Gas Industry

Maintenance

Boilers - Basic Principles and Types

Description:

This interactive training unit is designed to introduce trainees to fundamental concepts related to industrial plant boilers. After completing this unit, trainees should be able to describe the basic requirements for steam production and combustion and explain how a boiler produces steam. They should also be able to identify three types of heat transfer and explain how heat transfer occurs in a typical boiler. In addition, trainees should be able to describe how water, combustion gases, and steam flow through fire tube and water tube boilers.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBBP

Objectives:

- **Principles of Operation**
  - State the basic requirements for steam production.
  - State the basic requirements for combustion.
  - Explain in general terms how a boiler produces steam.
- **Heat Transfer**
  - Describe heat transfer.
  - State three ways in which heat transfer can occur in a typical boiler.
  - Identify problems that can interfere with proper heat transfer and the effect of each on boiler operation.
- **Boiler Types**
  - Name two basic types of boilers.
  - Describe the basic differences between fire tube and water tube boilers.
  - Describe how water, combustion gases, and steam flow through fire tube and water tube boilers.

Content:

- Principles of Operation
  - Steam Production and Combustion; Basic Boiler Operating Principles
- Heat Transfer
  - Types of Heat Transfer; Heat Transfer Problems; Heat Transfer in a Boiler
- Boiler Types
  - Fire Tube Boilers; Water Tube Boilers

Maintenance

Boilers - Combustion, Water, and Steam

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with combustion in a boiler and the flow of air and combustion gases during boiler operation. After completing this unit, trainees should be able to identify the elements needed for combustion in a boiler, explain how fuel is delivered to the burners, and describe the parts and operation of various types of burners. They should also be able to describe the air and gas flow path through a boiler and describe methods used to remove particulates and harmful gases from combustion gases. In addition, trainees should be able to explain when and why vents, drains, blowdown valves, and soot blowers are used.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBOW

Objectives:

- **Combustion Equipment**
  - Describe the parts and operation of typical gas burners, oil burners, and stokers.
- **Air Flow**
  - Identify some devices used to improve the efficiency of boiler operations.
  - Explain how air flow is produced in a typical boiler.
  - Explain why changes in boiler load require fuel and air adjustments.
  - State why it is necessary to maintain a proper fuel-to-air ratio in a boiler.
  - Describe the parts and basic operation of a typical rotary air heater.
  - Explain how rotary air heaters improve efficiency of boiler operations.
- **Water and Steam Flow**
  - Explain how natural circulation occurs in a typical water tube boiler.
  - Explain how controlled circulation occurs in a typical water tube boiler.
  - Describe an economizer, why it is used, and how it improves efficiency.
  - Name some devices commonly used to remove moisture

Content:

- Combustion Equipment
  - Gas Burners; Oil Burners; Stokers
- Air Flow
  - Draft; Fuel-to-Air Ratio; Air Heaters
- Water and Steam Flow
  - Boiler Water Circulation; Economizers; Moisture Separators

Maintenance

Introduction to Compressors

Description:

This interactive training unit is designed to familiarize trainees with the operation of compressors and compressed gas systems. After completing this unit, trainees should be able to describe two general types of compressors and the components and operation of a typical compressed air system. They should also be able to explain the hazards and safety precautions of compressors and compressed gas systems. In addition, trainees should be able to describe the functions of systems and devices that are commonly used with compressors and compressed gas systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCIN

Objectives:

- **Compressors and Systems**
  - Describe two general types of compressors.
  - Describe some characteristics that all compressors share.
  - Identify the components of a typical compressed air system.
  - Describe the operation of a typical compressed air system.
  - Describe hazards and safety precautions associated with compressors.
  - Describe hazards and safety precautions associated with compressed gas systems.
- **System Components**
  - Describe the function of a filter.
  - Describe the function of an air cooling system and a water cooling system.
  - Describe the function of a lubrication system.
  - Describe the function of an oil separator.
  - Describe the function of a demister.
  - Describe the function of a dryer.
  - Describe the function of a receiver.
  - Describe the function of an unloader.
  - Describe the function of safety valves.

Content:

- Compressors and Systems
  - Compressors
  - Compressed Air Systems
  - Compressor Hazards
- System Components
  - Filtering, Cooling, and Lubrication
  - System Auxiliaries

Maintenance

Centrifugal Compressors

Description:

This interactive training unit is designed to explain centrifugal compressor components and operation. It also covers disassembly and reassembly of a vertically split compressor and the various checks and measurements that are made to compressor components.

Duration:

2 hours

Course Code:

IHRDC_OM_AMCCC

Objectives:

- **Introduction**
  - Describe the operation of a centrifugal compressor.
  - Identify the components of a horizontally split centrifugal compressor.
  - Identify the components of a vertically split centrifugal compressor.
  - Describe the main components of a compressor lubrication system.
  - Define surging.
- **Compressor Overhaul**
  - Describe some common precautions and preparations associated with centrifugal compressor maintenance.
  - Describe one way to remove intercoolers, diffusers, impellers, diffuser covers, and pinion shaft assemblies from a vertically split centrifugal compressor.
  - Describe some common checks and measurements that are made during a compressor overhaul.
  - Describe a procedure for reassembling a vertically split centrifugal compressor.

Content:

- Introduction
  - Components and Operation
  - Support Systems
- Compressor Overhaul
  - Maintenance Practices
  - Disassembly
  - Component Inspection
  - Reassembly

Maintenance

Operation of Centrifugal and Axial Compressors

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the startup, operation, and shutdown of centrifugal and axial compressors. After completing this unit, trainees should be able to describe the general functions of instrumentation and control devices used with centrifugal and axial compressors. They should also be able to identify operator responsibilities associated with starting up, operating, and shutting down centrifugal and axial compressors.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCOC

Objectives:

- **Instrumentation and Control**
  - State the general features of instrumentation and control devices used with centrifugal and axial compressors.
  - Describe how instrumentation and control devices can maintain the values of a compressor's process variables.
  - Describe how instrumentation and control devices can keep a compressor operating within a stable operating range.
- **Operation**
  - Describe the general steps involved in preparing a compressor for startup.
  - Describe the general steps involved in warming up a compressor.
  - Describe the general steps in starting gas flow to a compressor and bringing a compressor up to operating speed.
  - Describe typical compressor operating checks.
  - Describe some of the general steps involved in a compressor shutdown.

Content:

- Instrumentation and Control
  - Functions
  - Surge Control
- Operation
  - Startup
  - Operation and Shutdown

Maintenance

Positive Displacement Compressors

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the operation of positive displacement compressors. After completing this unit, trainees should be able to identify the main parts and describe the general operation of various types of reciprocating and rotary compressors. They should also be able to identify operator responsibilities associated with starting up, operating, and shutting down compressors.

Duration:
2 hours

Course Code:
IHRDC_OM_AOCPD

Objectives:

- **Compressor Types**
  - Identify the main parts of a reciprocating compressor.
  - Describe the general operation of a reciprocating compressor.
  - Identify different types of reciprocating compressors and describe their operation.
  - Identify the main parts of a typical rotary compressor.
  - Describe the general operation of different types of rotary compressors.
- **Compressor Operations**
  - Describe general checks that should be made before a compressor is started.
  - Describe general procedures for starting up a compressor.
  - Describe general checks that should be made while a compressor is running.
  - Describe general procedures for shutting down a compressor.
  - Describe general procedures for putting a portable compressor in operation.

Content:

- Compressor Types
  - Reciprocating Compressors
  - Reciprocating Compressor Variations
  - Rotary Compressors
- Compressor Operations
  - Pre-Startup Checks
  - Startup, Operation, and Shutdown
  - Portable Compressors

Maintenance

Reciprocating Compressors

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of reciprocating compressors. After completing this unit, trainees should be able to identify the main components of a reciprocating compressor, explain how the compressor operates, and describe routine maintenance tasks that are commonly performed on reciprocating compressors. They should also be able to describe tasks generally associated with a compressor overhaul.

Duration:

2 hours

Course Code:

IHRDC_OM_AMCAC

Objectives:

- **Compressor Basics**
  - Identify the main components of a reciprocating air compressor.
  - Describe the general operation of a reciprocating air compressor.
  - Describe factors that determine air compressor design.
  - Describe components that are part of lubrication, air flow, cooling, and moisture removal systems in a typical reciprocating air compressor.
  - Describe tasks routinely performed to maintain the efficiency of a reciprocating air compressor.
- **Overhaul**
  - Identify and describe components of a reciprocating air compressor that are removed during compressor disassembly.
  - Describe a procedure for disassembling a reciprocating air compressor.
  - Describe a procedure for cleaning and inspecting internal components of a reciprocating air compressor.
  - Describe a procedure for reassembling a reciprocating air compressor.

Content:

- Compressor Basics
  - Components and Operation
  - Routine Maintenance
- Overhaul
  - Disassembly
  - Cleaning and Inspection
  - Reassembly

Maintenance

Types of Compressors - Centrifugal and Axial

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the parts and operation of centrifugal and axial compressors. After completing this unit, trainees should be able to describe the main parts and the general operation of single-stage centrifugal compressors, multistage centrifugal compressors, and axial compressors. They should also be able to describe the functions of compressor lubrication systems, seals, bearings, and common auxiliary devices.

Duration:
2 hours

Course Code:
IHRDC_OM_AOCCA

Objectives:

- **Compressor Types**
  - Describe the basic operation of a centrifugal compressor.
  - Describe the basic operation of an axial compressor.
  - Describe the components and operation of a single-stage centrifugal compressor.
  - Describe the components and operation of a multistage centrifugal compressor.
  - Describe the components and operation of an axial compressor.
- **System Components**
  - Describe the function of a compressor lubrication system.
  - Describe the functions of compressor seals and a seal oil system.
  - Describe the function of bearings.
  - Describe how drivers and couplings are used with compressors.
  - Describe the function of an aftercooler.
  - Describe the function of safety valves and receivers in compressor systems.

Content:

- Compressor Types
  - Introduction
  - Centrifugal Compressors
  - Axial Compressors
- System Components
  - Lubrication, Seals, and Bearings
  - Auxiliary Devices

Maintenance

Drive Components, Couplings, and Clutches

Description:

This course discusses drive components, couplings, and clutches. Drivers and their driven equipment are important in the operation of many industrial processes. During operation, the shaft of the driver turns and transmits power to the shaft of the driven equipment.

Duration:

45 minutes

Course Code:

IHRDC_OM_GMCOU

Objectives:

- State some functions of equipment drive components.
- Define the following terms: endplay, torque, and torque surge.
- Describe general operator checks and safety concerns related to equipment drive components.
- Explain what a coupling is.
- Identify and describe some commonly used fixed speed couplings.
- Describe general operator checks and concerns that apply to fixed speed couplings.
- Explain what a variable speed coupling is.
- Define the term 'slip'.
- Identify and describe some commonly used variable speed couplings.
- Describe general operator checks and concerns that apply to variable speed couplings.
- Explain what a clutch is.
- Describe the function of a typical disc clutch.
- Describe general operator checks and concerns that apply to clutches.

Content:

- Drive Components
- Fixed Speed Couplings
- Variable Speed Couplings
- Clutches

Maintenance

Drive Component Operations

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the general operation of equipment drive components, in particular, couplings and clutches. After completing this unit, trainees should be able to describe the general function of equipment drive components and some general operator checks and safety concerns related to equipment drive components. They should also be able to identify and describe various types of couplings and a typical clutch, as well as describe common operator checks and concerns that apply to these particular equipment drive components.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEBP

Objectives:

- **Introduction**
  - Explain what equipment drive components are and state some of their functions.
  - Describe general operator checks and safety concerns related to drive components.
  - Explain why different types of drive components may be used together in some instances.
  - Describe basic operating characteristics that affect the operation of rotating equipment and define the following terms: endplay, torque, torque surge, and shock load.
- **Couplings**
  - Explain what a coupling is and describe its general function.
  - Identify and describe some commonly used fixed speed couplings.
  - Describe common operator checks and concerns that apply to fixed speed couplings.
  - Explain what a variable speed coupling is, and describe its general function.
  - Define slip.
  - Identify and describe some commonly used variable speed couplings.
  - Describe common operator checks and concerns that apply to

Content:

- Introduction
  - Drive Components
  - Characteristics
- Couplings
  - Fixed Speed Couplings
  - Variable Speed Couplings
- Clutches
  - Clutch Fundamentals
  - Operator Checks

Maintenance

Gear, Belt, and Chain Drives

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the operation of gear drives, belt drives, and chain drives. After completing this unit, trainees should be able to describe the general function of gear drives, belt drives, and chain drives, and explain how each of these equipment drive components operates to transfer power from a driver to a piece of driven equipment. They should also be able to describe operator checks that are commonly performed on gear drives, belt drives, and chain drives.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEGB

Objectives:

- **Gears**
  - Explain what a gear drive is, and its general function.
  - Identify the major components of a typical gearbox.
  - Describe typical operator checks and concerns that apply to gear drives.
- **Belts and Chains**
  - Explain what a belt is and describe its general function.
  - Describe typical single and multiple V-belt drives.
  - Explain what a chain drive is and its general function.
  - Describe a typical chain drive and some common ways that chain drives are lubricated.
  - Describe typical operator checks and concerns that apply to belt drives.
  - Describe typical operator checks and concerns that apply to chain drives.

Content:

- Gears
  - Function
  - Operator Checks
- Belts and Chains
  - Belt Drives
  - Chain Drives
  - Operator Checks

Maintenance

Gears - Overhauls

Description:

This interactive training unit is designed to explain major tasks involved in gearbox overhauls. Trainees learn about disassembly and reassembly procedures for two types of gearboxes: a double action unit and a worm gear unit. Trainees will also learn typical checks and measurements performed during gearbox overhauls.

Duration:

2 hours

Course Code:

IHRDC_OM_AMGG1

Objectives:

- **Disassembly and Reassembly**
  - Describe precautions associated with the disassembly of a double-reduction gearbox.
  - Describe one way to remove the upper housing of a double-reduction gearbox.
  - Describe how to remove the bearing endcaps and internal components of a double-reduction gearbox.
  - Describe common methods of removing and installing a gear on its shaft.
  - Describe precautions associated with gearbox reassembly.
  - Describe the installation of the gears and endcaps in a typical double-reduction gearbox.
  - Describe how to complete the reassembly of a typical double-reduction gearbox.
  - Identify differences in preparing a unit to be stored and preparing a unit to be returned to service.
- **Checks and Measurement**
  - Describe the procedure to check for shaft endplay.
  - Describe the procedure to check for backlash and tooth contact.
  - Describe the procedure to check for shaft

Content:

- Disassembly and Reassembly
  - Disassembly
  - Gear Removal and Replacement
  - Reassembly
- Checks and Measurements
  - Endplay
  - Backlash and Tooth Contact
  - Shaft Runout
- Worm Gearsets
  - Basic Components
  - Disassembly
  - Reassembly

Maintenance

Gears - Types and Characteristics

Description:

This interactive training unit is designed to introduce trainees to gears and gear arrangements. After completing this unit, trainees should know how a gearset basically works. They should be familiar with different types of gears and gear arrangements, and understand commonly used gear terminology. They should also be able to identify common gear problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AMGG2

Objectives:

- **Fundamentals**
  - Describe the function of gears.
  - Describe how power, speed, and torque are involved in the operation of gears.
  - Describe characteristics of spur gears.
  - Describe characteristics of bevel gears.
  - Describe characteristics of spiral bevel gears.
  - Describe characteristics of helical gears.
  - Describe characteristics of hypoid gears.
  - Describe characteristics of worm gears.
  - Define the term backlash.
  - Define the term endplay.
  - Define the term tooth contact.
- **Gearsets**
  - Identify the components of a typical gearbox.
  - Describe characteristics of a mechanical differential gearset arrangement.
- **Gear Problems**
  - Identify some problems that can cause bearing failure.
  - Describe gear tooth breakage and some conditions that can cause it.
  - Describe some gear lubrication problems.
  - Describe how scoring aff

Content:

- Fundamentals
  - Speed and Torque; Basic Types of Gears; Worm Gears
  - Backlash, Endplay, and Tooth Contact
- Gearsets
  - Basic Gearbox Components; Mechanical Differentials
- Gear Problems
  - Bearing Failures; Tooth Breakage; Improper Lubrication; Scoring and Pitting

Maintenance

Shaft Alignment - Fundamentals

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with measuring and correcting shaft misalignment. After completing this unit, trainees should be able to describe the basic types of misalignment, conditions that may affect shaft alignment, and how to perform a rough alignment.

Duration:

2 hours

Course Code:

IHRDC_OM_AMSAF

Objectives:

- **Introduction**
  - Describe the basic types of misalignment.
  - Describe how a proper orientation to equipment should be established prior to alignment procedure.
  - Describe basic measurements that are necessary for determining misalignment.
  - Describe how misalignment is corrected.
  - Describe the basic operation of two types of dial indicators commonly used for alignment work.
- **Conditions Affecting Alignment**
  - Identify common foundation problems and describe preparations performed on equipment foundations.
  - Describe what a soft foot is.
  - Describe a procedure for measuring and correcting a soft foot condition.
  - Describe what pipe strain is, and how it can affect shaft alignment.
  - Describe a procedure for measuring pipe strain.
  - Describe how a bent shaft or bad bearings can affect shaft alignment.
  - Describe a procedure for measuring shaft runout.
  - Describe what the

Content:

- Introduction
  - Types of Misalignment; Alignment Orientation; Basic Measurements and Corrections
- Conditions Affecting Alignment
  - Foundation Problems; Soft Foot; Pipe Strain; Shaft and Bearing Problems; Thermal Growth
- Rough Alignment Procedure
  - Basic Preparations; Straightedge and Feeler Gage Method

Maintenance

Shaft Alignment - Reverse Dial and Laser

Description:

This interactive training unit is designed to familiarize trainees with equipment and procedures for aligning shafts using the reverse dial method and using a laser system. After completing this unit, trainees should be able to prepare and set up equipment for a reverse dial and laser-based alignment. They should also be able to measure shaft misalignment and determine how it should be corrected so that the alignment is within specified tolerances.

Duration:

2 hours

Course Code:

IHRDC_OM_AMSRD

Objectives:

- **Preparing for a Reverse Dial Alignment**
  - Review the basic types of shaft misalignment.
  - Describe the arrangement of instruments used to perform a reverse alignment.
  - Describe the general types of preparations required for a shaft alignment using the reverse dial method.
- **Performing a Reverse Dial Alignment**
  - Explain how to measure misalignment in the vertical plane using the reverse dial method.
  - Explain how to construct a graph representing misalignment in the vertical plane that is measured by the reverse dial method.
  - Describe how to correct misalignment in the vertical plane.
  - Explain how to measure misalignment in the horizontal plane using the reverse dial method.
  - Explain how to construct a graph representing misalignment in the horizontal plane that is measured by the reverse dial method.
  - Describe how to correct misalignment in the horizontal plane.
  - Explain ho

Content:

- Preparing for a Reverse Dial Alignment
  - Fundamentals
  - Equipment Preparations
- Performing a Reverse Dial Alignment
  - Overview
  - Measuring Vertical Plane Alignment
  - Measuring Horizontal Plane Alignment
  - Graphing and Correcting Horizontal Misalignment
  - Alignment Tolerances
- Laser Alignment
  - System Parts and Operation

Maintenance

Shaft Alignment - Rim and Face

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with measuring and correcting shaft misalignment using the rim and face method. After completing this unit, trainees should be able to describe the basic types of misalignment, general preparations for a rim and face shaft alignment procedure, and explain how to use the rim and face shaft alignment procedure. They should also be able to explain how to use the rim and face method to measure and correct misalignment on horizontally mounted equipment and on vertically mounted equipment.

Duration:

2 hours

Course Code:

IHRDC_OM_AMSRF

Objectives:

- **Getting Started**
  - Review the basic types of shaft alignment.
  - Describe the arrangement of dial indicators and their mounting brackets for a rim and face shaft alignment.
  - Describe equipment checks and adjustments that are generally made before alignment readings are taken using the rim and face method.
- **Aligning Horizontally Mounted Equipment**
  - Explain how to take measurements on horizontally mounted equipment for a rim and face alignment.
  - Explain how to measure misalignment in the vertical plane using the rim and face method.
  - Explain how to construct a graph representing misalignment in the vertical plane that is measured by the rim and face method.
  - Describe how to correct a misalignment in the vertical plane.
  - Explain how to measure misalignment on the horizontal plane using the rim and face method.
  - Explain how to construct a graph representing misalignment in the hor

Content:

- Getting Started
  - Fundamentals
  - General Preparations
- Aligning Horizontally Mounted Equipment
  - Preliminary Measurements
  - Vertical Plane Misalignment
  - Horizontal Plane Misalignment
- Aligning Vertically Mounted Equipment
  - Preparations
  - Measuring Misalignment
  - Correcting Misalignment

Maintenance

Hydraulic Actuators

Description:

This unit is designed to familiarize trainees with the operation of various types of cylinders and hydraulic motors in hydraulic systems. After completing this unit, trainees should be able to describe the basic components and common types of single-acting cylinders and double-acting cylinders. They should also be able to describe the basic components and operation of common types of vane motors, gear motors, piston motors, and partial rotation actuators.

Duration:
2 hours

Course Code:
IHRDC_OM_AHHAC

Objectives:

- **Cylinders**
  - Describe the basic components and operation of a single-acting load-return cylinder.
  - Describe the basic components and operation of a single-acting spring return cylinder.
  - Describe the basic components and operation of a telescoping cylinder.
  - Describe the basic components and operation of a double-acting cylinder.
  - Describe the basic components and operation of a double-rod cylinder.
  - Describe the basic functions of piston rings, rod seals, rod wipers, and cylinder cushions.
  - Describe how fixed and pivoting cylinder mountings can be used to mount linear actuators.
- **Motors**
  - Describe the basic components and operation of a vane motor.
  - Explain what a balanced vane motor is.
  - Describe the basic components and operation of an external gear motor.
  - Describe the basic components and operation of an internal gear motor.
  - Describe the basic components an

Content:

- Cylinders
  - Single-Acting
  - Double-Acting
  - Features
- Motors
  - Vane
  - Gear
  - Piston
  - Partial Rotation Actuators

Maintenance

Hydraulic Component Inspection and Replacement

Description:

This unit is designed to familiarize trainees with typical procedures for removing, inspecting, reassembling, and reinstalling hydraulic system components. After completing this unit, trainees should be able to describe typical procedures for disassembling, inspecting, reconditioning, reassembling, and reinstalling valves, pumps, and cylinders.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHCI

Objectives:

- **Removal and Inspection**
  - Describe general precautions and preparations for safely removing and disassembling components from a hydraulic system.
  - Describe typical procedures for disassembling and inspecting valves that are commonly used in hydraulic systems.
  - Describe typical procedures for disassembling and inspecting a fixed displacement vane pump.
  - Describe typical procedures for disassembling and inspecting a hydraulic cylinder.
- **Reassembly and Reinstallation**
  - Describe general procedures for reassembling and reinstalling hydraulic system components.
  - Describe typical procedures for reconditioning, reassembling, and reinstalling valves that are used in a hydraulic system
  - Describe typical procedures for reconditioning and reassembling a fixed displacement vane pump.
  - Describe typical procedures for reinstalling a pressure compensat

Content:

- Removal and Inspection
  - Basic Preparations
  - Valve Inspection
  - Pump Inspection
  - Cylinder Inspection
- Reassembly and Reinstallation
  - General Guidelines
  - Valve Reconditioning and Reinstallation
  - Pump Reconditioning and Reinstallation
  - Cylinder Reconditioning and Reinstallation

Maintenance

Hydraulic Diagrams

Description:

This unit is designed to familiarize trainees with hydraulic system schematic diagrams. After completing this unit, trainees should be able to interpret symbols that are used in hydraulic system schematic diagrams and use schematic diagrams to trace fluid flow through various types of hydraulic circuits.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHDI

Objectives:

- **Symbols**
  - Identify symbols used to represent the basic parts of a hydraulic circuit.
  - Identify types of lines represented on a hydraulic schematic diagram.
  - Identify symbols used to represent the following pumps: unidirectional fixed displacement, bi-directional fixed displacement, unidirectional variable displacement, bi-directional variable displacement.
  - Identify symbols used to represent the following components: reservoirs, accumulators, heaters, coolers, and filters.
  - Identify symbols used to represent the following linear actuators: single-acting, double-acting, fixed cushion cylinder and adjustable cushion.
  - Identify symbols used to represent the following hydraulic motors: unidirectional, fixed displacement, bi-directional, fixed displacement, unidirectional, variable displacement, bi-directional, variable displacement.
  - Identify symbols used to represent the following valves: pressure relief valve, flow control

Content:

- Symbols
  - Overview
  - Pumps
  - Fluid Storage and Fluid Containers
  - Actuators
  - Valves
- Reading Diagrams
  - Diagram Reading Basics
  - Automatic Venting Circuit
  - Accumulator Circuit
  - Regenerative Circuit

Maintenance

Hydraulic Fluid and Reservoirs

Description:

This unit is designed to familiarize trainees with the fluid used in hydraulic systems and with the basic functions and uses of filters and strainers, reservoirs, conductors, and accumulators. After completing this unit, trainees should be able to describe the functions, characteristics, and types of fluid that may be used in hydraulic systems. They should also be able to describe typical uses of filters and strainers, the components and accessories of typical reservoirs, the various types of conductors and fittings, and the basic functions and common uses of accumulators in hydraulic systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHFS

Objectives:

- **Hydraulic Fluid**
  - Describe the functions of the fluid in a hydraulic system.
  - Describe properties that are considered when hydraulic fluid is selected for a specific application.
  - Describe the basic characteristics of various types of hydraulic fluid.
  - Explain how filters and strainers can be classified.
  - Describe typical uses of strainers and filters in hydraulic systems.
- **Reservoirs and Conductors**
  - State the function of a reservoir in a hydraulic system.
  - Describe the components and accessories of a typical hydraulic fluid reservoir.
  - Describe various types of heat exchangers that may be used with hydraulic fluid reservoirs.
  - Describe types of conductors and fittings that are used in hydraulic systems.
- **Accumulators**
  - Describe the basic function and common uses of accumulators in hydraulic systems.
  - Describe the components

Content:

- Hydraulic Fluid
  - Types of Fluid
  - Filters and Strainers
- Reservoirs and Conductors
  - Reservoirs
  - Conductors
- Accumulators
  - Function and Applications
  - Types of Accumulators

Maintenance

Hydraulic Principles and Circuits

Description:

This unit is designed to familiarize trainees with the principles of hydraulic system operation and the components and operation of some typical hydraulic circuits. After completing this unit, trainees should be able to explain how force is transmitted through a liquid and how pressure and flow are related in a hydraulic system. They should also be able to describe the main concepts and basic operation of several types of hydraulic circuits.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHPC

Objectives:

- **Principles**
  - Explain what a liquid is and how liquids differ from solids and gases.
  - Explain how force is transmitted through a liquid.
  - Define the following terms: pressure, head, atmospheric pressure, vacuum, laminar flow, turbulent flow, velocity, and flow rate.
  - Describe the relationship between pressure and flow in a hydraulic system.
- **Circuits**
  - List the main components of a basic hydraulic circuit and describe the function of each component.
  - Describe the basic operation of an automatic venting circuit.
  - Describe the basic operation of an accumulator circuit.
  - Describe the basic operation of a regenerative circuit.

Content:

- Principles
  - Characteristics of Liquids
  - Pressure and Flow
- Circuits
  - Circuit Components
  - Typical Hydraulic Circuits

Maintenance

Hydraulic Pumps

Description:

This unit is designed to familiarize trainees with the operation of various types of pumps in hydraulic systems. After completing this unit, trainees should be able to describe the basic operation of common types of gear pumps, vane pumps, radial piston pumps, axial piston pumps, and pressure compensated piston pumps.

Duration:
2 hours

Course Code:
IHRDC_OM_AHHPU

Objectives:

- **Types of Pumps**
  - Describe the basic operation of a hydraulic power circuit.
  - Describe the role of a pump in a typical hydraulic power circuit.
  - Describe how positive displacement pumps work and explain why they are used in hydraulic power circuits.
  - Describe the differences between a fixed displacement pump and a variable displacement pump.
- **Rotary Pumps**
  - Describe the basic operation of an external gear pump.
  - Describe the basic operation of an internal gear pump.
  - Describe the basic operation of a gerotor pump.
  - Describe the basic operation of an unbalanced vane pump.
  - Describe the basic operation of a pressure compensated vane pump.
  - Describe the basic operation of a balanced vane pump.
- **Piston Pumps**
  - Describe the basic operation of a fixed displacement radial piston pump.
  - Describe the basic operation of a variable d

Content:

- Types of Pumps
  - Pump Basics
  - Positive Displacement Pumps
- Rotary Pumps
  - Gear Pumps
  - Vane Pumps
- Piston Pumps
  - Radial Piston Pumps
  - Axial Piston Pumps
  - Pressure Compensated Piston Pumps

Maintenance

Hydraulic Valves 1

Description:

This unit is designed to familiarize trainees with the basic design and operation of various types of valves used in hydraulic systems. After completing this unit, trainees will be able to describe the functions of flow and pressure in a hydraulic system, and identify and describe various types of manually adjusted valves, sliding spool valves, and spring-biased valves. They should also be able to describe various ways in which valves can be actuated.

Duration:
2 hours

Course Code:
IHRDC_OM_AHHV1

Objectives:

- **Valve Basics**
  - Define flow and describe its function in a hydraulic system.
  - Define pressure and describe its function in a hydraulic system.
  - Explain the functions of valves in a hydraulic system.
  - Explain the term throttling.
  - Identify and describe a typical needle valve.
  - Identify and describe a typical globe valve.
  - Identify and describe a typical plug valve.
  - Identify and describe a typical ball valve.
  - Identify and describe a typical gate valve.
- **Actuated Valves**
  - Identify and describe the main components of a typical directional control, sliding spool valve.
  - Explain positioning of a directional control sliding spool valve.
  - Identify and describe a typical check valve.
  - Identify and describe a typical relief valve.
  - Identify and describe a typical pressure reducing valve.
  - Define cracking pressure and pressure override.
  - Describe three met

Content:

- Valve Basics
  - Basic Principles
  - Manually-Adjusted Valves
- Actuated Valves
  - Sliding Spool Valves
  - Spring-Biased Valves
  - Methods of Actuation

Maintenance

Hydraulic Valves 2

Description:

This unit is designed to familiarize trainees with the functions performed by various types of valves in hydraulic systems. After completing this unit, trainees should be able to describe how valves control flow rate, flow direction, and pressure in a hydraulic system. They should be able to describe the basic operation of a pressure-compensated flow control valve, a temperature-compensated flow control valve, various types of flow control circuits, a pressure reducing valve, a relief valve, a sequence valve, and a counterbalance valve.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHV2

Objectives:

- **Flow and Directional Control**
  - Describe what a non-adjustable orifice is and what it does.
  - List three factors that affect throttled flow through a valve.
  - Describe how a pressure-compensated flow control valve works.
  - Describe how a temperature-compensated flow control valve works.
  - Identify three different flow control circuits.
  - Describe a bleed-off circuit and how it is used.
  - Describe a meter-in circuit and how it is used.
  - Describe a meter-out circuit and how it is used.
  - Explain how a directional control sliding spool valve controls fluid direction in a hydraulic system.
- **Pressure Control**
  - Explain what a pressure reducing valve does and how it works.
  - Explain what a relief valve does and how it works.
  - Explain what a sequence valve does and how it works.
  - Explain what a counterbalance valve does and how it works.

Content:

- Flow and Directional Control
  - Flow Control Valves
  - Flow Control Circuits
  - Directional Control
- Pressure Control
  - Pressure Reduction and Relief
  - Sequencing and Counterbalancing

Maintenance

Routine Maintenance of Hydraulic Systems

Description:

This unit is designed to familiarize trainees with tasks associated with the regular or routine maintenance of hydraulic systems. After completing this unit, trainees should be able to describe general considerations and safety precautions associated with routine maintenance. They should also be able to describe procedures for performing external inspections and for maintaining the hydraulic fluid, the reservoir, filters and strainers, accumulators, and heat exchangers.

Duration:
2 hours

Course Code:
IHRDC_OM_AHHRM

Objectives:

- **General Recommendations**
  - Describe what routine maintenance is, and state its purpose.
  - Describe four steps involved in establishing a routine maintenance program.
  - Describe personal protective equipment and clothing that should be worn by personnel performing routine maintenance tasks.
  - Identify hazards of hydraulic fluid spills and describe one method of cleaning up a spill.
  - Describe what is generally meant by lock out and tag out and describe the purpose of such a procedure.
- **System Inspections**
  - List components that are typically checked during a visual inspection and explain why they are checked.
  - Describe problems to look for during a visual inspection of fluid lines on an operating hydraulic system.
  - Identify areas where fluid leaks are commonly found, and describe possible causes.
  - Describe the term starving the pump and identify one possible cause.
  - Explain wh

Content:

- General Recommendations
  - Establishing a Program
  - Safety
- System Inspections
  - Visual Inspections
  - Other External Inspections
- Component Maintenance
  - Fluid and Reservoir
  - Accumulators and Heat Exchangers

Maintenance

Troubleshooting of Hydraulic Systems

Description:

This unit is designed to familiarize trainees with general steps for analyzing problems in hydraulic systems. After completing this unit, trainees should be able to explain how to identify problems in hydraulic systems and describe common problems associated with hydraulic system components.

Duration:

2 hours

Course Code:

IHRDC_OM_AHHTR

Objectives:

- **Problem Analysis**
  - Identify prerequisite knowledge and skills that mechanics should have in order to troubleshoot hydraulic systems effectively.
  - Identify the basic steps of the troubleshooting process.
  - Describe the process of identifying a problem and taking preventive action in immediate response to a hydraulic system operating problem.
  - Describe how to evaluate common general symptoms of problems in a hydraulic system.
  - Describe common methods for applying the process of elimination to troubleshoot problems in hydraulic systems.
  - Describe major concerns associated with correcting problems and safely returning a hydraulic system to service.
- **Component Problems**
  - Describe common problems that may be associated with the hydraulic fluid, hoses, and accumulators in a hydraulic system.
  - Describe common problems that may be associated with the valves in a hydraulic system.
  - De

Content:

- Problem Analysis
  - Basics
  - Immediate Response
  - Problem Correction
- Component Problems
  - Fluid, Hose, and Accumulator Problems
  - Valve Problems
  - Cylinder Problems
  - Pump and Hydraulic Motor Problems

Maintenance

Bearings - Fundamentals

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of bearings. After completing this unit, trainees should be able to describe the basic functions of bearings, the various types of sliding surface and rolling contact bearings, and the procedures for removing a rolling contact bearing from a shaft. They should also know how to install a rolling contact bearing on a shaft.

Duration:
2 hours

Course Code:
IHRDC_OM_AMBIN

Objectives:

- **Bearing Basics**
  - State three basic functions of bearings.
  - Describe two basic categories of bearings.
  - Describe journal bearings and how they are constructed.
  - Describe thrust bearings and how they are constructed.
  - Describe basic methods of lubricating sliding surface bearings.
  - Describe common types of sliding surface bearing failures.
  - Describe the basic construction of a typical rolling contact bearing.
  - Describe each of the following rolling contact type bearings: *shallow groove ball bearings, deep groove ball bearings, spherical race ball bearings, cylindrical roller bearings, tapered roller bearings, barrel roller bearings, needle roller bearings, rolling contact thrust bearings, and angular contact bearings.*
  - Explain how rolling contact bearings can be lubricated.
  - Describe common types of rolling contact bearing failures.
- **Bearing Maintenance**
  - Des

Content:

- Bearing Basics
  - Operation
  - Sliding Surface Bearings
  - Rolling Contact Bearings
- Bearing Maintenance
  - Bearing Removal
  - Bearing Installation

Maintenance

Bearings - Rolling Contact

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of rolling contact bearings. After completing this unit, trainees should be able to describe common types of rolling contact bearings, and explain how they can be mounted and lubricated. Trainees should also be able to explain how to remove a failed rolling contact bearing and how to install a new one.

Duration:
2 hours

Course Code:
IHRDC_OM_AMBRB

Objectives:

- **Basic Concepts**
  - Describe the basic functions of a bearing.
  - Identify the basic parts of a typical rolling contact bearing.
  - Describe common types of ball bearings.
  - Describe common types of roller bearings.
  - Explain the difference between a press fit and a push fit.
  - Describe common methods of mounting rolling contact bearings.
  - Describe types of bearing housings.
  - Describe a common oil lubrication system for rolling contact bearings.
  - Describe a common method of greasing a bearing.
- **Bearing Failure and Removal**
  - Describe symptoms and causes of common types of rolling contact bearing failures.
  - Describe a procedure for removing a rolling contact bearing from a shaft.
- **Installation**
  - Describe preparations for installing a new rolling contact bearing.
  - Describe a procedure for installing a rolling contact bearing.

Content:

- Basic Concepts
  - Functions and Features
  - Types of Bearings
  - Mountings and Housings
  - Lubrication
- Bearing Failure and Removal
  - Types of Failures
  - Removal Technique
- Installation
  - Preparing for Installation
  - Installation

Maintenance

Bearings - Sliding Surface

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of sliding surface bearings. After completing this unit, trainees should be able to describe common types of journal bearings and thrust bearings, and explain how sliding surface bearings can be lubricated. They should also be able to describe common indications of bearing performance and common types of sliding surface bearing failures. Additionally, they should be able to describe procedures for disassembling, inspecting, and reassembling journal bearings and thrust bearings.

Duration:

2 hours

Course Code:

IHRDC_OM_AMBSB

Objectives:

- **Basic Concepts**
  - Describe two general categories of sliding surface bearings.
  - Describe common types of journal bearings.
  - Describe common types of thrust bearings.
  - Describe the process of film lubrication.
  - Describe ways that sliding surface bearings can be lubricated.
- **Performance**
  - Describe common indications of bearing performance.
  - Describe instruments that can be used to measure indications of bearing performance.
  - Describe common causes of sliding surface bearing failure.
- **Maintenance**
  - Describe a procedure for disassembling a journal bearing.
  - Describe what to look for during an inspection of a disassembled journal bearing.
  - Describe how to check the total clearance between a journal bearing and a shaft.
  - Describe a procedure for reassembling a journal bearing.
  - Describe how to take a thrust reading.
  - Des

Content:

- Basic Concepts
  - Types
  - Lubrication
- Performance
  - Performance Indications
  - Types of Failure
- Maintenance
  - Journal Bearing
  - Thrust Bearing

Maintenance

Lubricants and Bearings

Description:

This interactive training unit is designed to familiarize trainees with the types of lubricants and bearings used in industrial facilities. After completing this unit, trainees should be able to explain how lubricants reduce friction, describe the characteristics of oil and grease, and describe applications in which oils and greases are used as lubricants. Trainees should also be able to name several solid lubricants, and give an example of a synthetic lubricant. In addition, trainees should be able to describe sleeve bearings, rolling element bearings, and radial loads and thrust loads on shafts and bearings.

Duration:

2 hours

Course Code:

IHRDC_OM_AOELB

Objectives:

- **Oils and Greases**
  - Define friction and explain how lubricants reduce it.
  - Define viscosity and describe the effect of temperature on it.
  - Define oil and explain when it is a better lubricant than grease.
  - Define grease and describe its consistency and how it is indicated.
  - Describe when grease is a better lubricant than oil.
- **Solids, Additives, and Synthetics**
  - List three solid lubricants.
  - Explain how extreme-pressure lubricants protect gears.
  - Explain why lubricant oxidation is harmful.
  - Name two harmful substances formed from lubricant oxidation.
  - State a function of detergents and dispersants in lubricants.
  - Name a synthetic lubricant.
- **Bearings**
  - Describe lubricant action in sleeve bearings.
  - Describe how rolling elements help reduce friction.
  - Describe thrust loads and radial loads on shafts and bearings.

Content:

- Oils and Greases
  - Friction
  - Oil
  - Grease
- Solids, Additives, and Synthetics
  - Solid Lubricants
  - Additives and Synthetics
- Bearings
  - Sleeve Bearings
  - Rolling Element Bearings

Maintenance

Lubrication - Basics

Description:

This interactive training unit is designed to familiarize trainees with the properties and uses of various types of lubricants. After completing this unit, trainees should be able to explain why lubricants are used and describe some characteristic properties of lubricants. They should also be able to describe procedures for storing, handling, and applying lubricants.

Duration:
2 hours

Course Code:
IHRDC_OM_AMLBA

Objectives:

- **Introduction to Lubrication**
  - Describe three types of friction, three types of lubricants, and three levels of lubrication.
  - Describe some of the characteristic properties of lubricants.
  - Identify factors that usually affect the selection of a lubricant for a specific situation.
  - Explain how to use a typical lubrication chart.
- **Storing and Handling Lubricants**
  - Describe proper procedures for, and safety concerns associated with the storage of lubricants.
  - Describe common types of lubricant equipment.
  - Describe common safety concerns and precautions that are associated with the handling of lubricants.
  - Describe common procedures for handling, dispensing, and applying lubricants.
- **Oils and Greases**
  - Describe some of the typical groups of general oils.
  - Describe common methods of oil lubrication.
  - Describe some unique properties

Content:

- Introduction to Lubrication
  - Friction and Lubrication
  - Properties of Lubricants
  - Lubricant Selection
- Storing and Handling Lubricants
  - Lubricant Storage
  - Lubrication Equipment
  - Lubricant Handling
- Oils and Greases
  - Types of Oils
  - Oil Lubrication
  - Properties of Grease
  - Applying Grease

Maintenance

Lubrication - Using Lubricants

Description:

This interactive training unit is designed to familiarize trainees with some of the methods and devices used to lubricate equipment components such as bearings. After completing this unit, trainees should be able to describe the use of hand grease guns, pneumatic grease guns, grease cups, and centralized lubricators. They should also be able to explain the basic operation of drip-feed oilers, oil baths, bottle oilers, ring oilers, and circulating oil systems. In addition, trainees should be able to describe the use of contact seals, labyrinth seals, and mechanical seals, and to describe how valve packing is lubricated.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEUL

Objectives:

- **Lubricating with Grease**
  - Describe two ways in which hand grease guns can be filled.
  - Explain why bearing housings should be checked for overheating before greasing.
  - Describe how to grease a bearing with a drain hole.
  - Describe a pneumatic grease gun.
  - Name two types of automatic grease lubricators.
- **Lubricating with Oil**
  - List four items on a typical lubrication schedule or chart.
  - Name two ways that oil is dispensed from large drums.
  - Describe the operation of a drip-feed oiler.
  - Explain how an oil bath lubricates bearings and gears.
  - Name three ways to check oil level.
  - Explain how a bottle oiler maintains constant oil level.
  - Explain how a ring oiler works.
  - Describe a typical circulating oil system.
  - List three things to check in a circulating oil system.
- **Seals and Packing**
  - State two reasons for using

Content:

- Lubricating with Grease
  - Grease Guns
  - Automatic Grease Lubricators
- Lubricating with Oil
  - Lubrication Schedules
  - Lubricating Devices
  - Circulating Oil Systems
- Seals and Packing
  - Seals
  - Packing Lubrication

Maintenance

Pipes and Pipe Fittings

Description:

This interactive training unit is designed to familiarize trainees with common types of pipes, pipe joints, and pipe fittings, and to provide general guidelines for working with pipes. After completing this unit, trainees should be able to identify common materials used to make pipes, and explain how pipes are identified and sized. They should also be able to identify common types of pipe joints and pipe fittings, and describe procedures for calculating pipe lengths, cutting pipe, and threading pipe.

Duration:
2 hours

Course Code:
IHRDC_OM_AMPPP

Objectives:

- **Basics**
  - Identify some common materials used to make pipe and describe characteristics of those materials.
  - Describe how pipes are usually sized and explain how they are marked for identification.
  - Describe some common signs of wear and damage to look for during a pipe inspection.
  - State some basic guidelines for handling and storing pipes.
- **Joints and Fittings**
  - Identify some common types of pipe joints and describe their characteristics.
  - Identify some common types of pipe fittings and describe their functions.
- **Installation**
  - Describe some basic methods for calculating the length of pipe needed between fittings.
  - Identify some common tools used to cut pipe and explain how they operate.
  - Explain how to use a pipe die to cut threads in a pipe.

Content:

- Basics
  - Pipe Materials
  - Sizes and Identification
  - Inspection, Handling, and Storage
- Joints and Fittings
  - Joints
  - Fittings
- Installation
  - Calculating Pipe Length
  - Cutting Pipe
  - Threading Pipe

Maintenance

Piping - Basic Components and Functions

Description:

This interactive training unit is designed to familiarize trainees with some of the basic components commonly found in piping systems. After completing this unit, trainees should be able to state the purpose of piping and pipe fittings, and be able to list some common types of pipe fittings. They should also be able to describe devices that are used to accommodate the weight and movement of piping, and to explain how insulation and heat tracing help to control temperatures in piping systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPAB

Objectives:

- **Pipes and Pipe Fittings**
  - State the purpose of piping.
  - State the purpose of pipe fittings.
  - Describe the following types of pipe fittings: nipple, coupling, union, flange, elbow, tee, Y, bell reducer, bushing, plug, and cap.
- **Pipe Weight and Movement**
  - Explain why piping moves and why this movement needs to be controlled.
  - State the functions of pipe hangers and supports.
  - State the functions of expansion joints and expansion loops.
- **Insulation and Heat Tracing**
  - Explain why piping is insulated.
  - Describe how steam and electrical heat tracing methods work.

Content:

- Pipes and Pipe Fittings
  - Pipes and Connections
  - Types of Pipe Fittings
- Pipe Weight and Movement
  - Pipe Supports
  - Expansion Devices
- Insulation and Heat Tracing
  - Insulation
  - Heat Tracing

Maintenance

Piping - System Components and Operation

Description:

This interactive training unit is designed to familiarize trainees with some of the auxiliary components commonly found in piping systems. After completing this unit, trainees should be able to describe the function and operation of rupture discs, relief valves, safety valves, and some common types of steam traps. They should also be able to describe basic procedures for draining liquid systems and some typical operator checks for fluid systems.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPAS

Objectives:

- **Protective Devices**
  - Describe the function and operation of a rupture disc.
  - Describe the function and operation of a relief valve.
  - Describe the function and operation of a safety valve.
- **Steam Traps**
  - Describe the function of a steam trap.
  - Describe the operation of the following types of mechanical steam traps: float traps and inverted bucket traps.
  - Describe the operation of a thermostatic steam trap.
  - Describe some typical operator checks for steam traps.
- **System Operation**
  - Describe basic procedures for draining liquid systems.
  - Describe basic procedures for filling liquid systems.
  - Describe typical operator checks for fluid systems.

Content:

- Protective Devices
  - Rupture Discs; Relief Valves; Safety Valves
- Steam Traps
  - Mechanical Steam Traps; Thermostatic Steam Traps; Operator Checks
- System Operation
  - Draining Liquid Systems; Filling Liquid Systems; Operator Checks

Maintenance

Special Calculations in Pipes

Description:

This course describes methods for calculating parallel pipe offsets using both equal and unequal spread methods, and introduces common formulas for determining the areas of various surface configurations, the volumes of various-shaped tanks or other containers and the pressure of a liquid in a pipe or other container.

Duration:

45 minutes

Course Code:

IHRDC_OM_AMPSC

Objectives:

- Overview and Objectives
- Calculating Parallel Offsets
- Calculating Area
- Calculating Volume
- Calculating Pressure
- Glossary
- Performance Requirements Checklist

Content:

- Overview and Objectives
- Calculating Parallel Offsets
- Calculating Area
- Calculating Volume
- Calculating Pressure
- Glossary
- Performance Requirements Checklist

Maintenance

Flange Installation

Description:

This training unit is designed to familiarize trainees with the fit up and bolting of phalanged connections, copper tubing and the torch soldering method often used for copper joints, and the joining of plastic piping.

Duration:

45 minutes

Course Code:

IHRDC_OM_AMPIF

Objectives:

- Steel Flanges
  - Various types of flanges
  - Install various types of flanges
  - Correctly tighten and torque six-hole, eight-hole, and twelve-hole flanges
  - Copper Tubing
- Copper Tubing
  - Common types of copper tubing
  - Calculate take-off for copper fittings
  - Solder copper fittings to copper tubing
- Plastic Pipe
  - Various types of plastic piping
  - Calculate take-off for plastic fittings
  - Join plastic pipe and fittings using the solvent cement method

Content:

- Steel Flanges
  - Various types of flanges
  - Install various types of flanges
  - Correctly tighten and torque six-hole, eight-hole, and twelve-hole flanges
  - Copper Tubing
- Copper Tubing
  - Common types of copper tubing
  - Calculate take-off for copper fittings
  - Solder copper fittings to copper tubing
- Plastic Pipe
  - Various types of plastic piping
  - Calculate take-off for plastic fittings
  - Join plastic pipe and fittings using the solvent cement method

Maintenance

Centrifugal Pump Basics and Troubleshooting

Description:

This interactive training unit is designed to familiarize trainees with the basic operation of centrifugal pumps and general procedures for troubleshooting centrifugal pump problems. After completing this unit, trainees should be able to describe the basic operation of a centrifugal pump, explain how centrifugal pumps can be classified, identify the main parts of a centrifugal pump, and describe problems that can occur in them.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPC1

Objectives:

- **Pump Basics**
  - Name the two most common types of pumps and describe the differences between them.
  - Describe the basic operation of a centrifugal pump.
  - Identify and describe characteristics that are used to classify centrifugal pumps.
  - Describe advantages and applications of various types of centrifugal pumps.
- **Pump Parts**
  - Name the main external parts of a centrifugal pump and describe the function of each.
  - Name the main internal parts of a centrifugal pump and describe the function of each.
- **Troubleshooting**
  - Describe some general considerations associated with troubleshooting a centrifugal pump.
  - Describe symptoms of a centrifugal pump problem that can be heard, and list the probable causes of those symptoms.
  - Describe the causes and effects of cavitation, and explain how it can be eliminated.
  - Describe symptoms of a centrifug

Content:

- Pump Basics
  - Types of Pumps
  - Centrifugal Pump Operation
  - Classification of Centrifugal Pumps
- Pump Parts
  - External Parts
  - Internal Parts
- Troubleshooting
  - General Considerations
  - Common Symptoms
  - Internal Problems

Maintenance

Centrifugal Pump Overhaul

Description:

This interactive training unit is designed to familiarize trainees with basic procedures for overhauling a centrifugal pump. After completing this unit, trainees should be able to describe preparations for a centrifugal pump overhaul, procedures for disassembling a centrifugal pump, inspecting its parts, and reassembling it.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPC2

Objectives:

- **Preliminary Steps**
  - Describe general preparations for a centrifugal pump overhaul.
  - Describe safety precautions that should be taken as part of preparing to work on a centrifugal pump.
  - Describe a procedure for removing the upper half of a horizontally split centrifugal pump casing.
  - Describe a procedure for preliminary inspection of the internal parts of a centrifugal pump.
- **Disassembly and Assembly**
  - Describe a procedure for disassembling the internal parts of a centrifugal pump.
  - Identify the parts of a centrifugal pump to be inspected and state what to look for in each part.
  - Describe how to measure the clearance between a casing wearing ring and an impeller.
  - Explain how to determine if casing wearing rings are round.
  - Describe the procedure for performing a shaft runout test.
- **Reassembly**
  - List steps that are commonly taken

Content:

- Preliminary Steps
  - Preparation; Casing Removal; Preliminary Inspection
- Disassembly and Inspection
  - Disassembly; Inspection; Wearing Ring Measurements
  - Shaft Tests
- Reassembly
  - Reinstalling the Impeller; Reassembling and Reinstalling the Rotor; Reassembling the Casing

Maintenance

Multistage Centrifugal Pumps

Description:

This interactive training unit is designed to familiarize trainees with the basic operation, disassembly, and reassembly of a typical multistage centrifugal pump. After completing this unit, trainees should be able to describe the components and operation of a multistage centrifugal pump and explain how this kind of pump can be disassembled and reassembled when necessary.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPMC

Objectives:

- **Basic Concepts**
  - Identifyand describe the components of a typical multistage centrifugal pump.
  - Describe the operation of a typical multistage centrifugal pump.
  - Describe techniques that are commonly used to minimize axial thrust in a multistage centrifugal pump.
  - Describe techniques that are commonly used to minimize radial thrust in a multistage centrifugal pump.
  - Identify problems commonly found in multistage centrifugal pumps.
  - Describe techniques used to identify problems in a multistage centrifugal pump.
- **Pump Assembly**
  - Describe tasks that are commonly part of preparing for a pump disassembly.
  - Describe a general procedure for disassembling an axially split multistage centrifugal pump.
  - Describe tasks that are commonly performed when a radially split multistage centrifugal pump is disassembled.
  - Describe tasks that are commonly performed as part of removing compo

Content:

- Basic Concepts
  - Types of Multistage Centrifugal Pumps; Components and Operation
  - Minimizing Axial and Radial Thrust; Identifying Common Problems
- Pump Disassembly
  - Preparations; Axially Split Pumps; Radially Split Pumps; Shaft Assemblies
- Pump Reassembly
  - Shaft Assemblies; Axially Split Pumps; Radially Split Pumps; Return to Service

Maintenance

Positive Displacement Pumps

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of positive displacement pumps. After completing this unit, trainees should be able to describe the basic operation of various types of reciprocating and rotary positive displacement pumps. They should also be able to describe how to prepare for overhauling a positive displacement pump, disassemble the pump, clean and inspect its parts, and then reassemble it.

Duration:
2 hours

Course Code:
IHRDC_OM_AMPPD

Objectives:

- **Types and Operation**
  - Describe the basic operation of a piston pump.
  - Describe the basic operation of a plunger pump.
  - Describe the basic operation of a diaphragm pump.
  - Describe the basic operation of a double-acting pump.
  - Explain what a *duplex pump* is.
  - Describe the basic operation of a screw pump.
  - Describe the basic operation of a gear pump.
  - Describe the basic operation of a lobe pump.
  - Describe the basic operation of a sliding vane pump.
  - Describe the basic operation of a flexible member pump.
- **Overhaul Preparations and Pump Assembly**
  - Describe general preparations for a pump overhaul.
  - Describe basic tasks associated with disconnecting a pump from its motor and bedplate.
  - Explain how to remove the timing gears and the outboard bearing bracket from a two-screw rotary pump.
  - Describe a basic procedure for removing mechanical seals from a

Content:

- Types and Operation
  - Reciprocating Pumps
  - Rotary Pumps
- Overhaul Preparations and Pump Assembly
  - Overhaul Preparations
  - Initial Disassembly
  - Final Disassembly
- Cleaning, Inspection and Reassembly
  - Cleaning and Inspection
  - Reassembly

Maintenance

Seals - Gaskets and Packing

Description:

This interactive training unit is designed to familiarize trainees with the use of gaskets and packing to prevent or minimize leakage from equipment such as pumps and valves. After completing this unit, trainees should be able to identify various types of gaskets and explain how to cut and install gaskets. They should also be able to identify the components of a packing gland and explain how to remove and install packing.

Duration:
2 hours

Course Code:
IHRDC_OM_AMMSG

Objectives:

- **Gaskets**
  - Explain how gaskets work.
  - Describe common types of gaskets.
  - Describe a procedure for using a gasket cutter.
  - Describe a procedure for cutting a gasket by hand.
  - Describe a procedure for installing a basic flat gasket on a pump casing.
  - Describe a procedure for installing an "O" ring on a flange.
- **Packing**
  - Describe packing and explain how it works.
  - Describe components of a typical packing gland.
  - Describe compression and hydraulic packing.
  - Describe a procedure for removing old packing from a pump.
  - Describe a procedure for installing new packing on a pump.

Content:

- Gaskets
  - Operation
  - Cutting Gaskets
  - Installing Gaskets
- Packing
  - Operation
  - Packing Removal
  - Packing Installation

Maintenance

Seals - Mechanical

Description:

This interactive training unit is designed to familiarize trainees with the use and installation of various types of mechanical seals. After completing this unit, trainees should be able to identify the components of commonly used types of mechanical seals, explain why mechanical seals can fail, and identify causes of seal failures by examining seal components. They should also be able to disassemble a pump to remove a mechanical seal, take the appropriate installation measurements, and install a new mechanical seal.

Duration:
2 hours

Course Code:
IHRDC_OM_AMMES

Objectives:

- **Introduction**
  - Identify the components of a typical mechanical seal.
  - Describe how a typical mechanical seal operates.
  - Identify commonly used types of mechanical seals.
  - Describe some common causes of mechanical seal failures.
  - Explain how to identify causes of seal failures by examining seal components.
- **Preparations for Seal Installations**
  - Describe one way to disassemble a pump to remove a mechanical seal.
  - Describe checks and measurements commonly made during and after the pump disassembly to prepare for a mechanical seal installation.
- **Seal Installations**
  - Explain how certain pump components are temporarily reassembled so that preliminary measurements can be taken before a new mechanical seal is installed.
  - Describe one way to install an inside pusher seal.
  - Describe one way to install an elastomer bellows seal.
  - Descri

Content:

- Introduction
  - Seal Components
  - Types of Mechanical Seals
  - Mechanical Seal Failures
- Preparations for Seal Installations
  - Pump Disassembly
  - Pump Component Checks
- Seal Installations
  - Installation Measurements
  - Inside Pusher Seal Installation
  - Non-Pusher Seal Installation
  - Outside and Cartridge Seals

Maintenance

Basic Types and Operation of Valves 1

Description:

This interactive training unit is designed to introduce trainees to the basic parts and operation of valves commonly used in process systems. After completing this unit, trainees should be able to describe the purpose and uses of valves in process systems, identify the main parts of a typical valve, and describe the function of each part. They should also be able to describe the specific uses, parts, and operation of gate valves, globe valves, plug valves, ball valves, and butterfly valves.

Duration:
2 hours

Course Code:
IHRDC_OM_AOVB1

Objectives:

- **Introduction to Valves**
  - Describe purposes and uses of valves in process systems.
  - Describe how valves are lined up.
  - Identify main parts of a typical valve and their functions.
  - Describe flanged, threaded, and welded methods of attaching valves to piping systems.
  - Describe the locations of typical valve leaks and how to stop a packing leak.
  - Describe one method of lubricating a typical valve.
- **Valve Types**
  - Describe the function and operation of gate valves.
  - Describe typical applications of gate valves.
  - Describe the functions and operation of globe and needle valves and their typical applications.
  - Identify a plug valve and describe its function and operation.
  - Identify a three-way and a four-way valve and describe their function and operation.
  - Describe typical applications of plug valves.
  - Identify a ball valve and describe its function and operation.

Content:

- Introduction to Valves
  - Valves and the Process System
  - Valve Parts
  - Valve Problems and Maintenance
- Valve Types
  - Gate Valves
  - Glove Valves
  - Plug Valves
  - Ball Valves
  - Butterfly Valves

Maintenance

Basic Types and Operation of Valves 2

Description:

This interactive training unit is designed to introduce trainees to some valves that are commonly used to isolate components, to throttle flow, to prevent reverse flow through a process system, and to protect systems from overpressure conditions. After completing this unit, trainees should be able to identify and describe the basic functions and operation of diaphragm valves, pinch valves, and check valves. They should also be able to explain how relief valves and safety valves protect system equipment and piping from excessive pressure.

Duration:

2 hours

Course Code:

IHRDC_OM_AOVB2

Objectives:

- **Valve Types**
  - Identify a diaphragm valve and describe its functions and operation.
  - Identify a pinch valve and describe its functions and operation.
  - Identify swing check valves, lift check valves, and ball check valves, and describe their functions and operation.
- **Relief and Safety Valves**
  - Describe the function and operation of relief valves.
  - Describe typical uses of relief valves.
  - Describe the function and operation of safety valves.
  - Describe typical uses of safety valves.

Content:

- Valve Types
  - Diaphragm Valves
  - Pinch Valves
  - Check Valves
- Relief and Safety Valves
  - Relief Valves
  - Safety Valves

Maintenance

Safety Valves, Part 1

Description:

Safety valves are commonly used in gas and steam systems to relieve excess pressure before it can cause injuries or equipment damage. Safety valves open quickly to release large volumes of gas or steam. This course reinforces how various types of safety valves operate and how safety valves are maintained.

Duration:

30 minutes

Course Code:

IHRDC_OM_AMPSV1

Objectives:

- **Type of Saftey Valves**
  - Explain the parts and operation of a typical huddling chamber safety valve.
  - Discuss the parts and operation of a typical safety-relief valve.
  - Describe the parts and operation of a typical pilot-actuated relief valve.

Content:

- Type of Safety Valves
  - Parts and operation of a typical huddling chamber safety valve
  - Parts and operation of a typical safety-relief valve
  - Parts and operation of a typical pilot-actuated relief valve

Maintenance

Safety Valves, Part 2

Description:

Safety valves are commonly used in gas and steam systems to relieve excess pressure before it can cause injuries or equipment damage. Safety valves open quickly to release large volumes of gas or steam. This course reinforces how various types of safety valves operate and how safety valves are maintained.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPSV2

Objectives:

- **Operations on Saftey Valves**
  - Discuss performance of an external inspection on a safety valve.
  - Identify procedures for disassembling a safety valve.
  - Describe proper inspection of internal components.
  - Indicate the sequence for reassembling a safety valve.

Content:

- Operations on Safety Valves
  - Performance of an external inspection on a safety valve
  - Procedures for disassembling a safety valve
  - Proper inspection of internal components
  - Sequence for reassembling a safety valve

Maintenance

Valve Maintenance

Description:

This interactive training unit is designed to familiarize trainees with the basic procedures for performing routing maintenance on a valve and for performing a valve overhaul. After completing this unit, trainees should be able to describe tasks involved in preparing for valve maintenance and explain how to adjust and replace valve packing. They should also be able to describe how to disassemble a valve, inspect its parts, perform maintenance on it, and reassemble it.

Duration:
2 hours

Course Code:
IHRDC_OM_AMPV2

Objectives:

- **Routine Maintenance**
  - Describe tasks typically completed in preparation for performing maintenance on a valve.
  - Describe how to adjust packing in a valve.
  - Describe how to remove packing from a valve.
  - Describe how to replace the packing in a valve.
- **Valve Overhaul**
  - Describe a basic procedure for disassembling a valve.
  - Describe tasks associated with inspecting the parts of a valve.
  - Explain how lapping and spotting-in are performed on a valve seating area.
  - Describe a basic procedure for reassembling a valve and returning it to service.

Content:

- Routine Maintenance
  - Maintenance Preparations
  - Adjusting and Replacing Packing
- Valve Overhaul
  - Disassembly and Inspection
  - Maintenance
  - Reassembly

Maintenance

Valve Types and Operation

Description:

This interactive training unit is designed to familiarize trainees with the basic components and operation of valves commonly found in industrial sites. After completing this unit, trainees should be able to explain how valves can be classified, describe the parts and operation of various types of valves, and describe how valves can be operated.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPV1

Objectives:

- **Valve Fundamentals**
  - Describe the basic purpose of a valve.
  - Identify the basic components of a valve.
  - Identify the valves that are commonly classified.
- **Valve Types**
  - Describe the basic components and operation of a gate valve.
  - Describe the basic components and operation of common types of globe valves.
  - Describe the basic components and operation of a plug valve, a ball valve, and a butterfly valve.
  - Describe the basic components and operation of a diaphragm valve.
  - Describe the basic components and operation of a swing check valve, a lift check valve, and a ball check valve.
- **Valve Operation**
  - Describe how a handwheel is used to operate a valve.
  - Describe how a handle is used to operate a valve.
  - Identify and describe common types of pneumatically, hydraulically, and electrically powered mechanical operators for valves.<

Content:

- Valve Fundamentals
  - Valve Characteristics
  - Valve Classifications
- Valve Types
  - Gate Valves
  - Globe Valves
  - Plug, Ball, and Butterfly Valves
  - Diaphragm Valves
  - Check Valves
- Valve Operation
  - Manual Operation
  - Mechanical Operators

Maintenance

Arc Welding

Description:

This interactive training unit is designed to familiarize trainees with the basic concepts associated with arc welding. After completing this unit, trainees should be able to describe various hazards associated with arc welding and what can be done to protect personnel from those hazards, identify and describe the parts and operation of a basic arc welding machine, and describe basic tasks involved in preparing for a welding job. They should also be able to identify and describe the equipment used for three common arc welding methods: shielded metal arc welding, metal inert gas arc welding, and tungsten inert gas arc welding.

Duration:

2 hours

Course Code:

IHRDC_OM_AEEDC

Objectives:

- **Fundamentals**
  - Describe hazards associated with welding.
  - Describe ways of providing basic protection to personnel from hazards associated with welding.
  - Describe precautions that should be taken when an arc welding unit is set up.
  - Describe the basic process of arc welding.
  - Identify and describe the parts of a basic arc welding unit.
  - Describe the basic operation of an arc welding unit.
  - Describe basic tasks involved to prepare for a welding job.
- **Welding Methods**
  - Identify and describe the equipment used for shielded metal arc welding.
  - Identify and describe the equipment used for metal inert gas arc welding.
  - Identify and describe the equipment used for tungsten inert gas arc welding.

Content:

- Fundamentals
  - Safety
  - Welding Equipment
  - Preparations
- Welding Methods
  - Shielded Metal Arc Welding
  - Metal Inert Gas Welding
  - Tungsten Inert Gas Welding

Maintenance

Operations of Forklifts

Description:

This interactive training unit is designed to familiarize trainees with the basic design and operation of forklifts. After completing this unit, trainees should be able to describe how forklifts can be classified and identify the major features and common working dimensions of a forklift. They should also be able to explain how to inspect a forklift, how to recharge or refuel a forklift, and how to operate a forklift safely.

Duration:

2 hours

Course Code:

IHRDC_OM_AMFOO

Objectives:

- **Basics**
  - Describe ways in which forklifts can be classified and identify the types of forklifts that are most appropriate for use in specific working conditions.
  - Identify the major features of most forklifts.
  - Describe the common working dimensions of a forklift.
  - Describe how to operate a typical forklift.
  - Describe general safety considerations associated with forklift operation.
- **Routine Tasks**
  - Describe tasks that are performed during typical forklift startup and preventive inspections.
  - Describe basic procedures and safety precautions associated with recharging electric forklifts and refueling forklifts that have internal combustion engines.
- **Forklift Stability and Loads**
  - Explain the basic principles of forklift stability and describe how they affect forklift operation.
  - Describe general guidelines for handling loads safely wi

Content:

- Basics
  - Types of Forklifts
  - Major Features
  - Basic Forklift Operation
  - Forklift Traffic Safety
- Routine Tasks
  - Inspections
  - Recharging and Refueling
- Forklift Stability and Loads
  - Stability
  - Handling Loads

Maintenance

Oxy-Fuel Gas Welding

Description:

This interactive training unit is designed to familiarize trainees with the basic parts and safe operation of oxy-fuel gas welding rigs. After completing this unit, trainees should be able to describe common oxy-fuel gas welding applications and safety concerns associated with the use of oxy-fuel gas welding equipment. They should also be able to describe the parts of a typical oxy-fuel gas welding rig and explain how to assemble a rig, light the torch, and then disassemble the rig.

Duration:

2 hours

Course Code:

IHRDC_OM_AMWIG

Objectives:

- **Basics**
  - Describe common oxy-fuel gas welding applications.
  - Describe characteristics of oxygen and acetylene.
  - Describe safety concerns associated with oxy-fuel gas welding and identify precautions that can be taken.
- **Parts and Maintenance**
  - Describe characteristics of oxygen and acetylene cylinders.
  - State precautions associated with properly storing and transporting oxygen and acetylene cylinders.
  - Describe oxygen and acetylene regulator types and gauges.
  - State some basic guidelines for handling regulators.
  - Describe oxygen and acetylene hoses.
  - State some basic guidelines for handling hoses.
  - Describe characteristics of welding and cutting torches and tips.
- **Assembly, Lighting and Disassembly**
  - Describe tasks associated with assembling an oxy-fuel gas welding rig.
  - Describe three types of oxy-fuel flames.
  - Explai

Content:

- Basics
  - Applications
  - Oxygen and Acetylene
  - Safety
- Parts and Maintenance
  - Assembly
  - Lighting
  - Disassembly

Maintenance

Filter Circuits

Description:

In this course, participants will learn to describe the purpose of a filter circuit as well as how to identify the major components of a filter circuit. This course also covers some of the common types of filter circuits and how filter circuits are used on power conditioning systems.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELFIL

Objectives:

- **Overview**
  - Describe the purpose of a filter circuit.
  - Identify the components of filter circuits.
  - Explain common types of filter circuits.
- **Power Conditioning**
  - Describe the use of filter circuits on power conditioning.

Content:

- Overview
  - Purpose of a filter circuit.
  - Components of filter circuits.
  - Common types of filter circuits.
- Power Conditioning
  - Filter circuits on power conditioning.

Maintenance

J-K Flip-Flops

Description:

J-K flip-flops are used in different digital, computational, and control processes. This course discusses the architecture and operation of a J-K flip-flop, different categories and operational characteristics of J-K flip-flops, and even how to construct a truth table to illustrate all of the J-K flip-flop's possible inputs and outputs.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELJKF

Objectives:

- **Overview**
  - Identify a basic J-K flip-flop logic diagram.
  - Explain how a basic J-K flip-flop circuit operates.
  - Discuss two categories of J-K flip-flop circuits.
  - Discuss the operational characteristics of J-K flip-flop circuits.
- **Applications**
  - Identify three applications of a J-K flip-flop circuit.

Content:

- Overview
  - J-K flip-flop logic diagram
  - Operation of J-K flip-flop circuit
  - Two categories of J-K flip-flop circuits
  - Operational characteristics of J-K flip-flop circuits
- Applications
  - Three applications of a J-K flip-flop circuit

Maintenance

Parallel Circuits

Description:

The components of an electrical or electronic circuit can be connected in many different ways. The two simplest of these are called series and parallel and occur very frequently. Components connected in parallel are connected so the same voltage is applied to each component. In this course, participants will learn about the fundamentals of parallel circuits as well as how to calculate current, voltage, and resistance in them.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELPAR

Objectives:

- **Overview**
  - Define a parallel circuit.
  - State the relationship between current and voltage in a parallel circuit.
  - Calculate total resistance in a parallel circuit.
  - Calculate total current in a parallel circuit.
  - Calculate voltage drops across each resistor in a parallel circuit.

Content:

- Overview
  - Parallel circuit
  - Relationship between current and voltage in a parallel circuit
  - Total resistance in a parallel circuit
  - Total current in a parallel circuit
  - Voltage drops across each resistor in a parallel circuit

Maintenance

Series Circuits

Description:

The components of an electrical or electronic circuit can be connected in many different ways. The two simplest of these are called series and parallel and occur very frequently. Components connected in series are connected along a single path, so the same current flows through all of the components. In this course, you will learn about the fundamentals of series circuits as well as how to calculate current, voltage, and resistance in them.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELSER

Objectives:

- **Overview**
  - Define a series circuit.
  - State the relationship between current and voltage in a series circuit.
- **Calculations**
  - Calculate total resistance in a series circuit.
  - Calculate total current in a series circuit.
  - Calculate voltage drops across each resistor in a series circuit.

Content:

- Overview
  - Series circuit
  - Relationship between current and voltage in a series circuit
- Calculations
  - Total resistance in a series circuit
  - Total current in a series circuit
  - Voltage drops across each resistor in a series circuit

Maintenance

Series-Parallel Circuits

Description:

The components of an electrical or electronic circuit can be connected in many different ways. The two simplest of these are called series and parallel and occur very frequently. Components connected in series are connected along a single path, so the same current flows through all of the components. Components connected in parallel are connected so the same voltage is applied to each component. In this course, you will learn about the fundamentals of series and parallel circuits as well as how to calculate current, voltage, and resistance in them.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELSPC

Objectives:

- **Overview**
  - Define a series-parallel circuit.
- **Calculations**
  - Calculate total resistance in a series-parallel circuit.
  - Calculate branch currents in a series-parallel circuit.
  - Calculate voltage drops in a series-parallel circuit.

Content:

- Overview
  - Series-parallel circuit
- Calculations
  - Total resistance in a series-parallel circuit
  - Branch currents in a series-parallel circuit
  - Voltage drops in a series-parallel circuit

Maintenance

Transistor Oscillators

Description:

An oscillator is a device or circuit that converts a constant power supply such as direct current (DC) into a fluctuating current or signal. This converted signal can be alternating current (AC) or fluctuating DC. The specific oscillators covered in this course are the Armstrong oscillator; the Hartley oscillator; the Colpitts oscillator; the phase shift oscillator; and bistable, monostable, and astable multivibrators.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELTRO

Objectives:

- **Overview**
  - Identify the major circuit components of transistor oscillators.
  - Describe the differences between the three fundamental types of oscillator circuits.
- **Multivibrators**
  - Explain the operation of a multivibrator.

Content:

- Overview
  - Major circuit components of transistor oscillators
  - Differences between the three fundamental types of oscillator circuits
- Multivibrators
  - Operation of a multivibrator

Maintenance

Troubleshooting Electrical Circuits

Description:

This interactive training unit is designed to familiarize trainees with the use of basic troubleshooting procedures to troubleshoot problems in electrical circuits. After completing this unit, trainees should be able to identify and describe the mainsteps of a basic troubleshooting procedure and use the procedure to troubleshoot problems in electrical equipments and electrical systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AEETA

Objectives:

- **Troubleshooting Fundamentals**
  - Explain what troubleshooting is.
  - Identify and describe the main steps of a basic troubleshooting procedure.
  - Describe how electrical tests can be used in the process of elimination.
  - Describe two basic ways that the process of elimination can be used in troubleshooting.
- **Troubleshooting Examples**
  - Describe how to troubleshoot a problem in a piece of electrical equipment.
  - Describe how to troubleshoot a problem in an electrical system.

Content:

- Troubleshooting Fundamentals
  - What is Troubleshooting?
  - The Process of Elimination
- Troubleshooting Examples
  - Electrical Equipment
  - Electrical Systems

Maintenance

Troubleshooting Operational Amplifier Circuits

Description:

This course will explain the process for troubleshooting an operational amplifier circuit. It will describe how to identify and verify an operational amplifier circuit problem as well as the process to determine how the circuit works. It will also describe methods to isolate faulty components and correct the problem.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELTOA

Objectives:

- **Overview**
  - Explain the troubleshooting process of an operational amplifier circuit.
  - Identify and verify an operational amplifier circuit problem.
  - Determine how an amplifier circuit works.

Content:

- Overview
  - Troubleshooting process of an operational amplifier circuit
  - Identify and verify an operational amplifier circuit problem
  - How an amplifier circuit works

Maintenance

Use of Ohm's and Kirchhoff's Laws in DC Circuits

Description:

The relationship between current, voltage, and resistance was described by George Simon Ohm in a form that commonly is referred to as Ohm's law. Ohm's law states that current is equal to voltage divided by resistance. This law is often expressed using symbols for each quantity. The letter I is used to represent current, E represents voltage, and R represents resistance. Using these symbols, Ohm's law can be expressed as I=E/R. Kirchhoff's two laws also reveal a unique relationship between current, voltage, and resistance in electrical circuits that is vital to performing and understanding electrical circuit analysis. In this course, participants will learn how to use these laws when working with direct current (DC) circuits.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELOHK

Objectives:

- **Ohm's Law**
  - State the simple form of Ohm's law as it applies to voltage, current, and resistance.
  - Explain the more complex form of Ohm's law, which brings power into the equation.
  - Solve for various values of power, voltage, current, and resistance in a DC circuit using Ohm's law.
- **Kirchhoff's Law**
  - Discuss Kirchhoff's voltage and current laws.
  - Given a complex DC circuit, solve for current and voltage using Kirchhoff's voltage and current laws.

Content:

- Ohm's Law
  - Ohm's law as it applies to voltage, current, and resistance
  - Ohm's law, with power in the equation
  - Solve for various values of power, voltage, current, and resistance in a DC circuit using Ohm's law
- Kirchhoff's Law
  - Kirchhoff's voltage and current laws
  - Solve for current and voltage using Kirchhoff's voltage and current laws

Maintenance

Capacitors, Part 1

Description:

Capacitors are used to control and increase the amount of capacitance in electrical circuits. In this course, participants will learn about the principles, function, and construction of capacitors as well as how to calculate capacitance and RC time constants of circuits.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELCAP1

Objectives:

- **Overview**
  - Define capacitance.
  - Describe the construction of a capacitor.
  - Describe variables that affect capacitance.
- **Capacitors in Circuits**
  - Given a circuit containing capacitors, calculate total capacitance for series and parallel circuits.
  - Given a circuit containing capacitors and resistors, calculate the time constant of the circuit.

Content:

- Overview
  - Capacitance.
  - Construction of a capacitor.
  - Variables that affect capacitance.
- Capacitors in Circuits
  - Calculate total capacitance for series and parallel circuits.
  - Calculate the time constant of the circuit.

Maintenance

Specialized Electronic Devices

Description:

This course covers several categories of semiconductor devices that have unique characteristics. The specific devices covered include Zener diodes, tunnel diodes, light-emitting diodes, and light-sensing diodes. To understand the operation of these devices and to be able to troubleshoot circuits that contain them, technicians must be familiar with their special characteristics as well as with basic semiconductor principles.

Duration:

30 minutes

Course Code:

IHRDC_OM_ICSED

Objectives:

- **Theory**
  - Explain the principles of P-N junction operation and associated biasing.
- **Diodes**
  - Explain the function of Zener and tunnel diodes.
  - Describe light-emitting diodes, light-sensing diodes, and associated applications.

Content:

- Theory
  - P-N junction operation and associated biasing
- Diodes
  - Zener and tunnel diodes
  - Light-emitting diodes, light-sensing diodes, and associated applications

Maintenance

Capacitors, Part 2

Description:

Conditions exist in any transmission and distribution system that result in power losses in the systems and equipment that deliver power and in the systems and equipment that use power. In order to compensate for these power losses, utilities often use devices such as capacitor banks and shunt reactors. This course covers the functions of substation capacitors and reactors as well as how they can be safely cleared, maintained, and tested.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELCAP2

Objectives:

- **Overview**
  - Describe the function of substation capacitor banks and reactors.
  - Explain how to de-energize, isolate a capacitor bank, and test for dead.
  - Describe how to remove capacitor and capacitor fuses.
  - Describe how to test the integrity of internal resistors and insulators.
  - Describe methods for checking the capacitance of capacitors and balance of a capacitor bank.
- **Shunt Reactors**
  - Identify types of substation shunt reactors.
  - Describe function and operation of a series reactor.

Content:

- Overview
  - Substation capacitor banks and reactors.
  - De-energize, isolate a capacitor bank, and test for dead.
  - Remove capacitor and capacitor fuses.
  - Test the integrity of internal resistors and insulators.
  - Capacitance of capacitors and balance of a capacitor bank.
- Shunt Reactors
  - Types of substation shunt reactors.
  - Function and operation of a series reactor.

Maintenance

Inductors, Part 1

Description:

Inductance is defined as the ability of a coil to store energy, induce a voltage in itself, and oppose changes in current flowing through it. In this training course, you will learn about the construction of inductors and how they oppose changes in current. You will also learn calculate the total inductance for series and parallel circuits as well as the time constant of the circuit.

Duration:

45 minutes

Course Code:

IHRDC_OM_ELIND1

Objectives:

- Define inductance.
- Describe the construction of an inductor.
- Describe how an inductor opposes a change in current.
- Describe variables that affect inductance.
- Given a circuit containing inductors, calculate total inductance for series and parallel circuits.
- Given a circuit containing inductors and resistors, calculate the time constant of the circuit.

Content:

- Introduction
- Inductor Function & Construction
- Principles of Inductance

Maintenance

Inductors, Part 2

Description:

Inductance is defined as the ability of a coil to store energy, induce a voltage in itself, and oppose changes in current flowing through it. This course describes the construction of inductors and how they oppose changes in current. Participants will also learn how to calculate the total inductance for series and parallel circuits as well as the time constant of circuits.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELIND2

Objectives:

- **Overview**
  - Explain the induction process.
  - Describe how electromagnetism is created.
  - Explain inductance.
  - Explain how the shape of conductors affects inductance.
- **Applications**
  - Describe the basic operation of a transformer
  - Describe the effects of inductance on circuits.

Content:

- Overview
  - Induction process
  - How electromagnetism is created
  - Inductance
  - How shape of conductors affects inductance
- Applications
  - Basic operation of a transformer
  - Effects of inductance on circuits

Maintenance

Operational Amplifiers, Part 1

Description:

Operational amplifiers, or op-amps, have many applications in electronics. One area in which op-amps are commonly used is electronic instrumentation equipment, and technicians who test and repair that equipment will encounter op-amp circuits in many phases of their work. It is essential that technicians be able to identify op-amps and understand how they work so that they can repair electronic circuits and restore instrumentation equipment to service. This course provides an introduction to op-amps and their basic characteristics. The course covers five common op-amp circuits: voltage followers, inverting amplifiers, non-inverting amplifiers, differential amplifiers, and instrumentation amplifiers.

Duration:
30 minutes

Course Code:
IHRDC_OM_ICOA1

Objectives:

- **Overview**
  - Describe the inherent characteristics of op-amps and packages they come in.
  - Identify types of amplifiers and their different characteristics.

Content:

- Overview
  - Characteristics of op-amps and packages they come in
  - Types of amplifiers and their different characteristics

Maintenance

Operational Amplifiers, Part 2

Description:

Operational amplifiers, or op-amps, are widely used in electronic instruments. Instrument technicians must be able to recognize basic op-amp circuits on schematic diagrams and, given certain input conditions, must be able to determine proper output conditions. Instrument technicians must also be able to isolate faults and replace faulty components in instruments that use op-amp circuits. This course is devoted to solving typical troubleshooting problems involving basic op-amp circuits.

Duration:
30 minutes

Course Code:
IHRDC_OM_ICOA2

Objectives:

- **Overview**
  - Explain the characteristics of four basic op-amp circuits.
- **Troubleshooting**
  - Describe troubleshooting of basic op-amp circuits.

Content:

- Overview
  - Characteristics of four basic op-amp circuits
- Troubleshooting
  - Troubleshooting of basic op-amp circuits

Maintenance

SCRs and TRIACs

Description:

This course provides an overview of several special semiconductor devices such as silicon-controlled rectifiers (SCRs) and triodes for alternating current (TRIACs). At the end of this course, participants will be able to explain the construction, operation, and applications of these two devices.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELSCT

Objectives:

- **Overview**
  - Describe the construction of SCRs and TRIACs.
  - Explain the operation of SCRs.
  - Explain the operation of TRIACs.
- **Applications**
  - State examples of SCR and TRIACs applications.

Content:

- Overview
  - Construction of SCRs and TRIACs
  - Operation of SCRs and TRIACs
- Applications
  - Examples of SCR and TRIACs applications

Maintenance

Transistor Configurations

Description:

Transistors are used in amplifier circuits in many different ways. The type of amplifier depends on the way that the transistors are connected in a circuit. Different connections yield different amplification characteristics. This course will describe common emitter configurations, common base configurations, and common collector configurations.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELTRC

Objectives:

- **Overview**
  - Identify the common emitter bipolar transistor configuration.
  - Identify the common base bipolar transistor configuration.
  - Identify the common collector bipolar transistor configuration.
- **Gainss**
  - State current gain, voltage gain, and power gain for each bipolar transistor configuration.

Content:

- Overview
  - Common emitter bipolar transistor configuration
  - Common base bipolar transistor configuration
  - Common collector bipolar transistor configuration
- Gainss
  - State current gain, voltage gain, and power gain for each bipolar transistor configuration

Maintenance

AC Generator Maintenance

Description:

The purpose of this course is to provide an overview of the operation and maintenance of large alternating current (AC) generators, which are primarily used to supply electrical power in the magnitude of kilowatts (thousands of watts) and megawatts (millions of watts). This course covers common AC generator maintenance tasks such as replacing brushes, performing overhauls, and conducting electrical tests.

Duration:

30 minutes

Course Code:

IHRDC_OM_EMACG

Objectives:

- **Brush Maintenance**
  - Describe the procedure for checking brushes on a typical AC generator and its exciter.
  - Describe the procedure for replacing brushes on a typical AC generator and its exciter.
- **Overview**
  - State the reason why cleaning is performed during a typical brush maintenance procedure.
  - List the major steps that are performed during a typical AC generator overhaul.
  - Describe two electrical tests that are commonly performed on a typical AC generator.

Content:

- Brush Maintenance
  - Procedure for checking and replacing brushes on a typical AC generator and its exciter
- Overview
  - Why cleaning is performed during a typical brush maintenance procedure
  - Major steps performed during a typical AC generator overhaul
  - Two electrical tests commonly performed on a typical AC generator

Maintenance

Battery Systems

Description:

This interactive training unit is designed to introduce trainees to industrial battery systems, and battery cells, and how to inspect and test batteries. After completing this unit, trainees should know the characteristics and basic operation of a typical battery system and its components. They should also understand how to inspect and perform basic tests on industrial batteries.

Duration:
2 hours

Course Code:
IHRDC_OM_AEETM

Objectives:

- **Introduction to Battery Systems**
  - Describe a typical industrial battery system.
  - List the basic components of a lead-acid cell.
  - Describe the electrochemical action in a cell that is charging.
  - Describe the electrochemical action in a cell that is discharging.
  - State the voltage rating for a typical cell at full charge.
  - Explain a cell's capacity rating.
  - Briefly describe the relationship of cell capacity, voltage, and specific gravity during discharge and recharge.
  - Describe the functions of a typical battery system charger.
  - List the common components of most battery chargers and describe their functions.
- **Inspection and Testing**
  - List the protective equipment and safety procedures associated with working on batteries.
  - Describe typical visual inspection checks.
  - State the purpose of and describe the basic steps for checking intercell and terminal connection

Content:

- Introduction to Battery Systems
  - System Overview
  - Cell Components
  - Cell and Battery Ratings
  - Battery Chargers
- Inspection and Testing
  - Battery System Safety
  - Battery Inspection
  - Voltage and Resistance Testing
  - Specific Gravity Testing

Maintenance

Electrical Production and Distribution

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the production and distribution of electric power for use by process systems. After completing this unit, trainees should be able to identify and explain the functions of the major components in an electrical distribution system. In addition, trainees should be able to describe general hazards associated with these systems and how to minimize the possible effects of the hazards.

Duration:
2 hours

Course Code:
IHRDC_OM_AOEEP

Objectives:

- **Power Generation**
  - In general terms, explain how power comes into an industrial facility from an off-site source.
  - List three sources of on-site power generation.
- **Power Distribution**
  - Identify and explain the function of the major components in a typical electrical power distribution system.
  - Identify general hazards associated with electrical distribution systems.
  - Describe, in general terms, how to aid a victim of electrical shock.
  - Describe, in general terms, how to extinguish an electrical fire.

Content:

- Power Generation
  - Off-Site Power Generation
  - On-Site Power Generation
- Power Distribution
  - System Components
  - Safety

Maintenance

Power Supplies

Description:

An electronic power supply is a device, or a group of devices, that converts normal generated alternating current (AC) power into power that is suitable for electronic equipment. This course focuses on the following devices included in electronic power supplies: transformers, rectifiers, filters, regulators, voltage multipliers, and voltage dividers. The components of a specific power supply are directly related to the requirements of the electronic equipment being served.

Duration:
30 minutes

Course Code:
IHRDC_OM_ICPSU

Objectives:

- **Overview**
  - Explain the function of a transformer.
- **Devices**
  - Identify half-wave rectifiers, full-wave rectifiers, and full-wave bridge rectifier circuits.
  - Explain the operation of capacitance filters, inductance filters, and capacitance-input filters.
  - Differentiate between a shunt regulator and a series regulator.
  - Explain the operation of a voltage multiplier circuit and a voltage divider circuit.

Content:

- Overview
  - Function of a transformer
- Devices
  - Identify half-wave rectifiers, full-wave rectifiers, and full-wave bridge rectifier circuits
  - Operation of capacitance filters, inductance filters, and capacitance-input filters
  - Shunt regulator and a series regulator
  - Operation of a voltage multiplier circuit and a voltage divider circuit

Maintenance

Kirchhoff's Law

Description:

Kirchhoff's two laws reveal a unique relationship between current, voltage, and resistance in electrical circuits that is vital to performing and understanding electrical circuit analysis. This course introduces Kirchhoff's voltage and current laws and explains how to use these laws to calculate the voltage and current of circuits.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELKIR

Objectives:

- **Theory**
  - State Kirchhoff's voltage law.
- **Calculations**
  - Given a circuit, solve for voltage using Kirchhoff's voltage law.
  - State Kirchhoff's current law.
  - Given a circuit, solve for current using Kirchhoff's current law.
  - Given a complex circuit, solve for current and voltage using Kirchhoff's voltage and current laws.

Content:

- Theory
  - Kirchhoff's voltage law
- Calculations
  - Solve for voltage using Kirchhoff's voltage law
  - Kirchhoff's current law
  - Solve for current using Kirchhoff's current law
  - Solve for current and voltage using Kirchhoff's voltage and current laws

Maintenance

Magnets and Magnetic Fields

Description:

Certain metals and metallic oxides have the ability to attract other metals. This property is called magnetism, and the materials that have this property are called magnets. Some magnets are found naturally while others must be manufactured. In this course, participants will learn about the characteristics and functions of magnets and electromagnets.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELMAM

Objectives:

- **Overview**
  - Describe the four characteristics of a magnet.
  - Discuss the following terms; permanent magnet; magnetic field ;lines of force; and density.
- **Electromagnitism**
  - Explain electromagnetism.
  - Describe an electromagnet.

Content:

- Overview
  - Four characteristics of a magnet
  - Permanent magnet; magnetic field ;lines of force; and density
- Electromagnitism
  - Electromagnetism
  - Electromagnet

Maintenance

Ohm's Law

Description:

The relationship between current, voltage, and resistance was described by George Simon Ohm in a form that is commonly referred to as Ohm's Law. Ohm's Law states that current is equal to voltage divided by resistance. This law is often expressed using symbols for each quantity. This course describes Ohm's law; the units in which power is measured; and how to solve for power, voltage, current, and resistance using Ohm's Law.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELOHM

Objectives:

- **Overview**
  - State the simple form of Ohm's Law as it applies to voltage, current and resistance.
  - Given two of the three values of voltage, current, and resistance, solve for the remaining value using Ohm's Law.
- **Power**
  - Define the term "power" and the units in which it is measured.
  - Discuss the more complex form of Ohm's Law, which brings power into the equation.
  - Solve for various values of power, voltage, current, and resistance using Ohm's Law.

Content:

- Overview
  - Ohm's Law as it applies to voltage, current and resistance.
  - Solve for voltage, current, and resistance using Ohm's Law/LI>
- Power
  - "Power" and its units
  - Ohm's Law, with power in the equation
  - Solve for power, voltage, current, and resistance using Ohm's Law

Maintenance

Cables and Conductors

Description:

This interactive training unit is designed to familiarize trainees with the basic construction and installation of electrical cables and conductors. After completing this unit, trainees should be able to describe the basic construction of cables and conductors, and how conductors are classified and rated. They should also be able to describe factors that affect the installation of a conductor for a specific application, and how to make splices and terminations.

Duration:

2 hours

Course Code:

IHRDC_OM_AEECC

Objectives:

- **Basic Concepts**
  - Describe the basic construction of conductors.
  - Describe how the physical characteristics of a conductor's wires affect how the conductor is classified and rated.
  - Describe how the physical characteristics of a conductor's insulation affect how the conductor is classified and rated.
- **Installation Requirements**
  - Describe factors that determine the current requirements of a circuit.
  - Describe factors that determine the voltage requirements of a circuit.
  - Describe characteristics in an environment that affect the type of conductor that should be installed.
  - Explain how environmental temperatures affect the type of conductor that should be installed.
- **Electrical Connections**
  - Describe factors that should be considered when a mechanical connector is selected.
  - Describe factors that should be considered when replacement insulati

Content:

- Basic Concepts
  - Construction
  - Classifications and Ratings
- Installation Requirements
  - The Circuit
  - The Environment
- Electrical Connections
  - Connectors and Replacement Insulation
  - Splices and Terminations

Maintenance

Conduit Installation

Description:

This interactive training unit is designed to familiarize trainees with the basic concepts of conduit and conduit fittings, and typical methods of cutting, bending, and installing conduit. After completing this unit, trainees should be able to describe the basic types of metallic and nonmetallic conduit, common types of conduit fittings, and procedures for cutting, bending, and installing metallic and nonmetallic conduit.

Duration:

2 hours

Course Code:

IHRDC_OM_AEECI

Objectives:

- **Materials**
  - Define terms that are commonly used to describe conduit and conduit installations.
  - Describe common types of metallic conduit.
  - Describe common types of nonmetallic conduit.
- **Fittings**
  - Describe types of couplings that are used to connect conduit in a straight line.
  - Describe types of fittings that are used to change the direction of a conduit run.
  - Describe types of fittings that are used to secure conduit when it is installed.
- **Cutting**
  - Describe a method for cutting rigid types of metal conduit.
  - Describe a method for cutting flexible types of metal conduit.
  - Describe methods for cutting nonmetallic conduit.
- **Bending**
  - Describe different types of conduit bends and explain where they might be used in an installation.
  - Explain how bends affect conduit measurements.
  - De

Content:

- Materials
  - Overview
  - Metallic Conduit
  - Nonmetallic Conduit
- Fittings
  - Making Straight Connections
  - Changing Run Direction
  - Securing Conduit
- Bending
  - Bend Types
  - Measurements
  - Demonstrations
- Installing
  - Termination to a Box
  - Pulling Conductors

Maintenance

Fasteners

Description:

This interactive training unit is designed to familiarize trainees with various types of fasteners used in electrical work. After completing this unit, the trainees should be able to describe common types of threaded and non-threaded fasteners and identify applications for which each type might be used. They should also be able to describe basic procedures for installing fasteners.

Duration:

2 hours

Course Code:

IHRDC_OM_AEEFA

Objectives:

- **Types of Fasteners**
  - Describe some common types of threaded fasteners and identify applications for which these fasteners may be used.
  - Describe some common types of non-threaded fasteners and identify applications for which these fasteners may be used.
- **Installing Fasteners**
  - Describe general steps for installing threaded fasteners.
  - Describe a typical procedure for installing a toggle bolt.
  - Describe a typical procedure for installing an anchor bolt in wet concrete.
  - Describe a typical procedure for installing an expansion anchor bolt in hardened concrete.
  - Describe a typical procedure for installing blind rivets.

Content:

- Types of Fasteners
  - Threaded Fasteners
  - Non-Threaded Fasteners
- Installing Fasteners
  - Basic Steps
  - Installing Toggle Bolts
  - Installing Anchor Bolts
  - Installing Blind Rivets

Maintenance

Grounding

Description:

Grounding is the chief means of protecting life and property from electrical hazards such as lightning, line surges, short circuits, and ground faults. Grounding also helps ensure the proper operation of a system. This course provides an overview of what grounding is, why it is necessary, and effective grounding techniques.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELGRD

Objectives:

- **Overview**
  - Define the term "grounding" and why it is necessary.
  - Explain common problems that can occur in grounding systems.
  - Describe the types of grounded electrical systems.
- **Applications**
  - Explain basic requirements for equipment grounding and bonding.
  - Describe the importance of an effectively grounded system.

Content:

- Overview
  - "Grounding" and why it is necessary.
  - Common problems that can occur in grounding systems.
  - Types of grounded electrical systems.
- Applications
  - Basic requirements for equipment grounding and bonding.
  - Importance of an effectively grounded system.

Maintenance

Introduction to the NEC

Description:

This interactive training unit is designed to familiarize trainees with the organization and layout of the National Electrical Code. After completing this unit, the trainees should be able to use the NEC to locate specific types of information.

Duration:

2 hours

Course Code:

IHRDC_OM_AEEIN

Objectives:

- **Overview**
  - Explain the purpose and describe the history of the NEC.
  - Describe how the NEC was developed and revised.
  - Describe the role of testing laboratories in developing the NEC.
  - Describe the purpose of the NFPA and the NEMA.
  - Explain the difference between mandatory rules and advisory rules.
  - Describe the kinds of information found in Articles 90, 100, and 110 of the NEC.
  - Define the terms labeled and listed.
  - Describe how the chapters of the NEC are organized.
  - Describe the different types of text used in the NEC.
- **Using the NEC**
  - Explain how to locate information for a particular procedure in the NEC.
  - Identify and describe key sections of the NEC that are often used as references for servicing electrical systems.
  - Describe how the NEC can be used as a reference for installing electrical systems.

Content:

- Overview
  - Purpose and History
  - Layout
- Using the NEC
  - Navigating
  - Examples

Maintenance

Splices and Terminations

Description:

This interactive training unit is designed to familiarize trainees with splices and terminations used in electrical systems of less than 600 volts. After completing this unit, the trainees should be able to identify basic types of electrical wiring, conductor terminals, and connectors; describe tools and materials required to make conductor splices and terminations; explain what makes a good electrical connection; describe common types of splices; and explain how to connect conductors to a terminal box on a 3-phase AC motor.

Duration:
2 hours

Course Code:
IHRDC_OM_AESAT

Objectives:

- **Hardware and Accessories**
  - Identify and describe basic types of electrical wiring.
  - Identify types of conductor terminals and connectors and describe the applications for which they are suitable.
  - Identify and describe tools and materials typically used in making conductor splices and terminations.
- **Making Connections**
  - Identify the basic requirements for a good electrical connection.
  - Describe how to make some common types of splices and identify the applications for which each type of splice is suitable.
  - Identify requirements for terminating conductors in enclosures.
  - Describe how to make up connections to a terminal box on a 3-pnase AC motor.

Content:

- Hardware and Accessories
  - Types and Sizes of Conductors; Terminals
  - Solder Connectors; Solderless Connectors (Compression and Mechanical)
  - Ring Terminal; Spade (Fork) Terminal; Quick Disconnect Terminals
  - Butt Splice and Reducing Connectors; Compression Connector Variations
  - Mechanical Connectors; Dual-Rated Connectors; Wire Connectors
  - Strippers and Crimpers; Solder and Soldering Tools; Insulation (Tubing and Tapes); Cable Ties and Cable Clips
- Making Connections
  - De-energizing Electrical Systems; Stripping Insulation; Selecting Connectors, Materials
  - Common Splicing Methods (Western Union Splice, Rattail Joint, Fixture Joint, and Knotted Tap Joint)
  - Enclosures; Motor Connections

Maintenance

AC and DC Motors

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with the operation of electric motors. After completing this unit, trainees should be able to explain the basic principles of motor operation and describe the basic operation of a simple AC motor and a simple DC motor. They should also be able to identify and describe the function of each part of a typical AC motor and a typical DC motor.

Duration:
2 hours

Course Code:
IHRDC_OM_AOEAC

Objectives:

- **Motor Fundamentals**
  - Explain the purpose of a motor.
  - Explain what is meant by motor action.
  - Explain the basic principles of motor operation.
  - Define the following terms: alternating current, rotor, and stator.
  - Describe how a simple AC motor operates.
  - Describe how a simple DC motor operates.
- **Motor Parts**
  - Identify the parts of a typical AC motor and describe the function of each part.
  - Identify the parts of a typical DC motor and describe the function of each part.

Content:

- Motor Fundamentals
  - Basic Motor Theory; AC Motor Fundamentals; DC Motor Fundamentals
- Motor Parts
  - AC Motors; DC Motors

Maintenance

DC Motors

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of DC motors. After completing this unit, trainees should be able to describe the operation and basic parts of a DC motor. They should also be able to describe basic procedures for maintaining and overhauling a DC motor.

Duration:

2 hours

Course Code:

IHRDC_OM_AEEDM

Objectives:

- **Motor Principles**
  - Explain what motor action is.
  - Describe armature reaction in DC motors.
  - Identify the basic parts of a DC motor.
  - Explain how DC motors can be classified.
- **Motor Maintenance**
  - Describe problems that can occur with the brushes in a DC motor.
  - Describe the characteristics of a good brush.
  - Explain how to inspect and replace brushes in a DC motor.
  - Describe how a commutator can be cleaned.
  - Describe typical commutator problems.
  - Describe a basic procedure for troubleshooting a DC motor's armature and field windings and their connections.
  - Describe how to test for grounds, opens, and shorts in a DC motor.
- **Motor Overhaul**
  - Describe how to disassemble a DC motor.
  - Describe how to inspect and clean a disassembled DC motor.
  - Describe how to reassemble a DC motor.

Content:

- Motor Principles
  - Motor Action
  - DC Motors
- Motor Maintenance
  - Brushes and Brush Rigging
  - Commutators
  - Troubleshooting
- Motor Overhaul
  - Disassembly
  - Inspection and Cleaning
  - Reassembly

Maintenance

Motor Branch Circuit Protection

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of motor branch circuits. After completing this unit, trainees should be able to describe the components of a typical motor branch circuit, preventive maintenance procedures, and one way to troubleshoot a problem in a motor branch circuit.

Duration:

2 hours

Course Code:

IHRDC_OM_AEEMB

Objectives:

- **Motor Branch Circuits**
  - Describe a typical motor branch circuit.
  - Identify and describe protection devices typically used in motor branch circuits.
  - Describe a procedure for overriding a safety switch enclosure interlock.
  - Describe general characteristics of fuses commonly used in motor branch circuits.
  - Describe how to determine what size fuse to use when the proper fuse rating for a motor branch circuit is unknown.
  - Describe a typical molded-case circuit breaker and explain how it can be reset.
  - Describe the operation of thermal, magnetic, and thermal-magnetic molded-case circuit breakers.
- **Maintenance**
  - Describe a low-impedance grounding system typically used with motor branch circuits and explain how it can be maintained.
  - Describe a general preventive maintenance procedure for a motor branch circuit.
  - Describe one way to troubleshoot a motor branch circuit.

Content:

- Motor Branch Circuits
  - Circuits
  - Safety Switches
  - Circuit Breakers
- Maintenance
  - Preventive Maintenance
  - Troubleshooting

Maintenance

Three Phase Motors

Description:

This interactive training unit is designed to familiarize trainees with three-phase AC motor operation, inspection, testing, and maintenance. After completing this unit, trainees should be able to explain the basic principles of three-phase AC motor operation, how to inspect one, and how to conduct electrical tests on one. They should also be able to explain how to disconnect, disassemble, clean, reassemble, and reconnect a three-phase AC motor.

Duration:

2 hours

Course Code:

IHRDC_OM_AEETP

Objectives:

- **Motor Principles**
  - Describe alternating current.
  - Explain the relationship between the three phases of three-phase alternating current.
  - Identify the basic parts of a three-phase AC motor.
  - Identify and describe common types of three-phase AC motors.
  - Describe the operation of a typical three-phase AC motor.
  - Explain what slip is, and describe the effects of increasing load on an AC motor.
  - Describe how speed control can be accomplished in a three-phase AC motor.
- **Inspection and Testing**
  - Describe how an operating and non-operating three-phase AC motor can be inspected.
  - Explain the purpose of an insulation test and describe how it can be conducted on a three-phase AC motor.
  - Describe how to test for grounds in the stator of a three-phase AC motor.
  - Describe how to test for opens in a wye-connected stator of a three-phase AC motor.
  - Describe how to test for open

Content:

- Motor Principles
  - AC Review
  - Three-Phase AC Motors
  - Speed Control
- Inspection and Testing
  - Motor Inspection
  - Insulation Testing
  - Stator Testing
  - Rotor Testing
- Motor Maintenance
  - Disconnection and Disassembly
  - Inspection and Cleaning
  - Reassembly and Reconnection

Maintenance

Introduction to Transformers, Breakers, and Switches

Description:

This interactive training unit is designed to familiarize trainees with the operation of transformers, circuit breakers, and various types of switches. After completing this unit, trainees should be able to explain the principles of transformer operation, identify some of the basic components of a transformer, and describe checks that are generally made during a transformer inspection. They should also be able to describe the general operation of a circuit breaker, explain how to reset a tripped circuit breaker and rack out a circuit breaker, and describe the basic operation of pushbutton switches and rotary switches.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEBS

Objectives:

- **Transformers**
  - Explain the function of a transformer.
  - Describe, in general terms, how a transformer works.
  - Identify and describe some of the basic components of transformers.
  - Describe checks that should be made when a transformer is inspected.
- **Breakers and Switches**
  - Describe the general operation of a circuit breaker.
  - List general steps associated with resetting a circuit breaker that has tripped.
  - List general steps associated with racking out a circuit breaker.
  - Describe the general function of a switch.
  - Explain how different types of pushbutton switches and rotary switches operate.

Content:

- Transformers
  - Operating Principles
  - Transformer Components
  - Transformer Inspection
- Breakers and Switches
  - Circuit Breaker Operation
  - Resetting and Racking Out
  - Switches

Maintenance

Electromagnetic Relays

Description:

When a fault occurs, current increases and voltage decreases. The increased current causes excessive heating, which depending on where the fault occurs, can result in a fire or an explosion. If the fault is not quickly isolated, it can cause damage that may result in loss of service. Various types of control systems are used to detect and isolate faults with minimum disturbance. A key component of all of these control systems is the protective relay. This course examines the functions and operation of some types of protective relays.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELELR

Objectives:

- **Overview**
  - Explain the purpose of using electromagnetic relays.
  - Identify four different elements that are used in electromagnetic relays.
  - Identify five different functions that electromagnetic relays are used for.

Content:

- Overview
  - Purpose of using electromagnetic relays.
  - Four elements used in electromagnetic relays.
  - Five functions electromagnetic relays are used for.

Maintenance

Fuses

Description:

This course introduces participants to the basic components of various types of fuses, explains how fuses are rated and sized, and describes basic procedures for troubleshooting a cartridge fuse.

Duration:

30 minutes

Course Code:

IHRDC_OM_ELFUS

Objectives:

- **Overview**
  - Describe the functions, basic components, and ratings of fuses.
  - Describe different types of fuses and the applications for which they are appropriate.
- **Applications**
  - Follow guidelines for sizing dual-element time-delay fuses and non-time-delay fuses.
  - Describe basic procedures for troubleshooting cartridge fuses.

Content:

- Overview
  - Functions, basic components, and ratings of fuses
  - Types of fuses and the applications
- Applications
  - Guidelines for sizing dual-element time-delay fuses and non-time-delay fuses.
  - Basic procedures for troubleshooting cartridge fuses.

Maintenance

Ground Fault Interrupters

Description:

Normally, electric current is designed to flow through circuits at levels predetermined to be safe and return to the power source. Occasionally, conditions are created where the current amount or path is altered from the specified design. This course describes differences in the types of abnormal current flow that can occur within an electrical circuit because of the altered conditions and how ground fault circuit interrupters can protect against electrical shock.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELGFI

Objectives:

- **Overview**
  - Describe the various circuit conditions.
  - Describe the basic operation of a ground fault circuit interrupter.
- **Applcation**
  - Identify applications for ground fault circuit interrupters.

Content:

- Overview
  - Various circuit conditions.
  - Basic operation of a ground fault circuit interrupter.
- Application
  - Applications for ground fault circuit interrupters.

Maintenance

High-Voltage Breakers and Switchgear

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of high voltage breakers and switchgear. After completing this unit, trainees should be able to describe the basic operation of an air-magnetic circuit breaker and an oil circuit breaker. They should also be able to explain how each type of circuit breaker extinguishes an arc, and describe basic procedures for racking out high voltage circuit breakers and performing maintenance and testing on them.

Duration:

2 hours

Course Code:

IHRDC_OM_AECHV

Objectives:

- **Principles of Operation**
  - Describe the main components of a typical air-magnetic circuit breaker.
  - Describe how an arc is extinguished in a typical air-magnetic circuit breaker.
  - Describe the main components of a typical oil circuit breaker.
  - Describe how an arc is extinguished in a typical oil circuit breaker.
  - Describe a typical undervoltage and overvoltage protection system used with high voltage circuit breakers.
- **Maintenance of Air-Magnetic Circuit Breakers**
  - Describe one way to disconnect an air-magnetic circuit breaker from power.
  - Describe how to inspect the interior of an empty switchgear cell.
  - Describe how to inspect the arc chutes and arc runners on a typical air-magnetic circuit breaker.
  - Describe how to inspect and clean the stationary and movable contacts on a typical air-magnetic circuit breaker.
  - Describe how to inspect the operating mechanism and the p

Content:

- Principles of Operation
  - Air-Magnetic Circuit Breakers
  - Oil Circuit Breakers
  - Circuit Protection
- Maintenance of Air-Magnetic Circuit Breakers
  - Preparations
  - Inspection and Cleaning
  - Electrical Tests
- Maintenance of Oil Circuit Breakers
  - Preparations
  - Inspection, Cleaning, and Reassembly

Maintenance

Maintenance of Low-Voltage Circuit Breakers

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of low voltage circuit breakers and switchgear. After completing this unit, trainees should be able to describe the basic operation of a circuit breaker and the basic functions of switchgear. They should be able to explain how an arc forms and how arcs can be extinguished, and also describe basic procedures for racking out a circuit breaker and performing maintenance and testing on it.

Duration:

2 hours

Course Code:

IHRDC_OM_AECLV

Objectives:

- **Basic Operation**
  - Describe how an electromagnetic trip device operates in a typical circuit breaker.
  - Describe how a thermal element trip device operates in a typical circuit breaker.
  - Describe how a dashpot can be used to delay the movement of a trip device.
  - Describe ways in which circuit breaker contacts can be closed.
  - Describe the functions of three sections of a typical switchgear assembly.
  - Describe how a typical circuit breaker is connected to primary power and control power.
- **Principles of Circuit Interruption**
  - Describe what an arc is and how it forms.
  - Describe how speed, distance, and cooling affect extinguishing an arc.
  - Describe how a metal fin arc chute can be used to extinguish an arc in a typical circuit breaker.
  - Explain what current zero is.
- **Maintenance**
  - Describe a procedure for racking a circuit breaker

Content:

- Basic Operation
  - Circuit Breakers
  - Switchgear
- Principles of Circuit Interruption
  - Arcs
  - Extinguishing an Arc
- Maintenance
  - Preventive Maintenance
  - Overhaul
  - Testing

Maintenance

Relays 1

Description:

The purpose of this unit is to teach the basic principles of protective relays and to introduce directional and nondirectional relays. The unit begins with the basic theory of protective relays, commonly used types of relays, and a brief explanation of how these relays are used. Additional details and examples are provided for directional and nondirectional relays. At the conclusion of this unit, the trainees should have a basic understanding of how protective relays work. They should be able to explain the need for protective relays and to list commonly used types of relays and their functions. They should also be able to explain how directional and nondirectional relays work and give examples of how they are used.

Duration:

2 hours

Course Code:

IHRDC_OM_TDRE1

Objectives:

- **Introduction to relays**
  - Explain the purpose of protective relays in a T&D system and describe how they are used. Describe five common relay elements and how they work.
- **Overcurrent relays**
  - Describe the basic operating principles of overcurrent relays and the conditions that cause them to operate.
- **Directional overcurrent relays**
  - Identify T&D equipment typically protected by directional overcurrent relays.
  - Describe the basic operating principles of directional overcurrent relays and the conditions that cause them to operate.
- **Reclosing relays**
  - Describe the basic function and operating principles of reclosing relays.
- **Voltage relays**
  - Identify the type of equipment that voltage relays typically protect.
  - Describe the basic operating principles of voltage relays and the co

Content:

- Introduction to Relays
  - Purpose and Use of Relays
  - Relay Elements: Plunger, Clapper, Induction Disc, Induction Cup and Solid-State Circuitry.
- Overcurrent Relays: Instantaneous and Time-delay
- Directional Overcurrent Relays: Usage, Operation and Three-Phase Directional Relays
- Reclosing Relays: Function, Components and Operation
- Voltage Relays: Overvoltage and Undervoltage Relays with Plunger Elements, Overvoltage Relay with an Induction Disc Element and Overvoltage/Undervoltage Relay
- Auxiliary Relays and Solid-state Relays

Maintenance

Relays 2

Description:

This unit continues the development begun in Relays 1 by introducing differential and pilot relays and discussing routine relay maintenance. At the conclusion of this unit, trainees should be able to explain how differential and pilot relays work and give examples of situations where they are used. They should also be able to describe how to approach routine inspection and maintenance and how to put a relay in or out of service.

Duration:
2 hours

Course Code:
IHRDC_OM_TDRE2

Objectives:

- **Introduction to relays**
  - Identify five common relay elements. Describe the functions of overcurrent, directional overcurrent, reclosing, voltage, and auxiliary relays.
- **Differential relays**
  - Identify what differential relays typically protect. Describe the basic operating principles of differential relays and the condition that causes a differential relay to operate.
- **Transfer tripping**
  - Describe the function of a transfer tripping system and identify its main components.
  - Identify four communication channels used for transfer tripping and explain how they work.
  - Identify the main equipment components associated with transfer tripping communication channels and describe their functions.
- **Distance relays**
  - Identify what distance relays typically protect.
  - Describe the basic operating principles of distance relays

Content:

- Introduction to relays
  - Relay elements (plunger element, clapper element, iInduction disc element, induction cup element and solid-state circuitry)
  - Basic protective relay functions (overcurrent relays, directional overcurrent relays, reclosing relays, voltage relays and auxiliary relays)
- Differential relays
  - Differential relay operation; current backfeed and differential relay operation; types
- Transfer tripping
  - Function of transfer tripping; transfer tripping example; communication channels and equipment
- Distance relays
  - Function of distance relays; zoned protection; construction and operation of a distance relay
- Pilot wire relaying
  - Pilot wire relaying system components and operation; pilot wire relay components and operation
- Breaker failure relaying system components and operation
- Timing relay components and operation

Maintenance

Transformers

Description:

Substations and switchyards contain various types of transformers. Among them are power transformers, current transformers, and potential transformers. Each of these types of transformers has unique features that distinguish it from the other types of transformers and from other substation and switchyard equipment. In this course, you will learn about these transformers as well as their connections and basic principles.

Duration:
30 minutes

Course Code:
IHRDC_OM_ELTRS

Objectives:

- **Overview**
  - List the essential parts of a simple transformer.
  - List common connection schemes for transformers.
  - List the different types of transformers.
- **Primary and Secondary Voltages**
  - Discuss the relationship between primary and secondary voltages and transformer turns ratio.
  - Discuss the relationship between primary and secondary currents and transformer turns ratio.

Content:

- Overview
  - Essential parts of a simple transformer
  - Common connection schemes for transformers
  - Different types of transformers
- Primary and Secondary Voltages
  - Relationship between primary and secondary voltages and transformer turns ratio
  - Relationship between primary and secondary currents and transformer turns ratio

Maintenance

Introduction to Actuators

Description:

This interactive training unit is designed to introduce trainees to actuators in general, and pneumatic actuators, in particular. After completing this unit, trainees should be able to identify and describe three basic types of actuators and explain how actuators position control valves. They should also be able to describe the basic design and operation of single- and double-acting diaphragm actuators, single- and double-acting piston actuators, van actuators, and positioners. Finally, trainees should be able to describe some common actuator problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOVIA

Objectives:

- **Actuators and Control Valves**
  - Define actuator and describe three basic types of actuators.
  - Describe the function of an actuator.
  - Describe the function of a controller.
  - Describe the function of a control valve.
- **Pneumatic Actuators**
  - Describe the basic design and operation of single-acting diaphragm and double-acting actuators.
  - Describe the basic operation of single-acting and double-acting piston actuators.
  - Describe the basic operation of a vane actuator.
  - Describe the function and basic operation of a positioner.
  - Describe some ways to identify actuator problems.
  - Describe some ways that an operator can identify actuator problems.
  - Describe a general procedure for handling a control valve failure.

Content:

- Actuators and Control Valves
  - Types of Actuators
  - Control Valves
- Pneumatic Actuators
  - Single-Acting Diaphragm Actuators
  - Double-Acting Diaphragm Actuators
  - Single- and Double-Acting Piston Actuators
  - Van Actuators
  - Positioners
  - Actuator Problems

Maintenance

Electric and Hydraulic Actuators

Description:

This interactive training unit is designed to introduce trainees to various types of electric and hydraulic actuators that are used to control valves in process systems. After completing this unit, trainees should be able to describe the basic operation of solenoid actuators, motor-operated actuators, and various types of hydraulic actuators. They should also be able to explain the function of a pilot valve and describe problems associated with hydraulic actuators.

Duration:
2 hours

Course Code:
IHRDC_OM_AOVEH

Objectives:

- **Electric Actuators**
  - Describe the basic operation of a solenoid actuator.
  - Describe the basic operation of a motor-operated actuator.
  - Describe the function of torque switches.
  - Describe the function of limit switches.
- **Hydraulic Actuators**
  - Describe the operation of a single-acting, spring-return hydraulic actuator.
  - Describe the basic operation of a double-acting hydraulic actuator.
  - Describe the function of a pilot valve.
  - Describe some ways to identify actuator problems.

Content:

- Electric Actuators
  - Solenoid Actuators
  - Motor-Operated Actuators
- Hydraulic Actuators
  - Single-Acting Hydraulic Actuators
  - Double-Acting Hydraulic Actuators
  - Pilot Valves
  - Hydraulic Actuator Problems

Maintenance

Basic Functions of AC Motor Controllers

Description:

This interactive training unit is designed to familiarize trainees with the basic functions and operation of AC motor controllers. After completing this unit, trainees should be able to explain how an AC motor controller operates and describe the operation of master switches and pilot devices that can be used with AC motor controllers. They should also be able to explain how an AC motor can provide overload protection and low voltage protection, and to describe the operation of special types of AC motor controllers.

Duration:
2 hours

Course Code:
IHRDC_OM_AEEA1

Objectives:

- **Introduction**
  - Describe how a manual controller can be used to control a motor.
  - Describe how a magnetic controller can be used to control a motor.
  - Describe the parts and operation of a typical magnetic contactor.
  - Describe the operation of a magnetic contactor in a typical AC motor controller.
  - Describe the operation of maintaining master switches and momentary master switches.
  - Describe the operation of float switches, pressure switches, limit switches, and flow switches.
  - Describe the operation of bellows thermostats and bimetallic strip thermostats.
  - Explain how a mercury switch can be used in a pilot device.
- **Protective Devices**
  - State the purpose of overload devices.
  - Describe the parts and operation of two types of thermal overload devices.
  - Describe the parts and operation of a typical magnetic overload device.
  - State the purpose of low voltage protecti

Content:

- Introduction
  - Basic Principles
  - Contactors
  - Master Switches and Pilot Devices
- Protective Devices
  - Overload Protection
  - Low Voltage Protection
- Special Motor Controllers
  - Reduced Voltage Start
  - Two-Speed
  - Reversible

Maintenance

Motor Controllers and Operation

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with what motor controllers do and how they do it. Typical steps for starting up, checking, and shutting down motors are also covered. After completing this unit, trainees should be able to explain how motor controllers control and protect motors. They should also be able to describe how to start up a motor, perform operating checks on a motor, and shut down a motor.

Duration:

2 hours

Course Code:

IHRDC_OM_AOEMC

Objectives:

- **Motor Controllers**
  - Explain the purpose of a motor controller.
  - Describe the features of a typical AC motor controller contactor.
  - Describe how a motor controller can protect a motor.
  - Using an electrical diagram, identify the parts of a typical AC motor controller and describe the function of each part.
  - State the purpose of overload devices.
  - Explain the difference between thermal and magnetic overload devices.
  - Identify the parts of typical overload devices and describe their operation.
- **Motor Operation**
  - List typical steps for starting up a motor.
  - Describe normal operating checks associated with motor operation.
  - List typical steps for shutting down a motor.

Content:

- Motor Controllers
  - Fundamentals
  - AC Controllers
  - Overload Devices
- Motor Operation
  - Startup
  - Operations
  - Switches

Maintenance

Motor Operators

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of motor operators. After completing this unit, trainees should be able to identify the main parts of a motor operator and explain how a motor operator opens and closes a valve. They should also be able to describe the parts and operation of limit and torque switches, and explain how these switches can be replaced and adjusted. In addition, they should be able to describe preventive maintenance procedures for a motor operator and explain how to troubleshoot a motor operator problem.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPMO

Objectives:

- **Mechanical Components**
  - Name the basic parts of a typical motor operator and describe the function of each part.
  - Describe how the gears in a typical motor operator work during motor-driven operation and during manual operation.
- **Electrical Controls**
  - Describe the parts and operation of a typical rotary drum limit switch, and explain how the switch is replaced and adjusted.
  - Describe the parts and operation of a typical torque switch, and explain how the switch is replaced and adjusted.
- **Maintenance and Troubleshooting**
  - Describe preventive maintenance procedures for a typical motor operator.
  - Explain how to troubleshoot a typical motor operator.

Content:

- Mechanical Components
  - Basic Components
  - Motor and Gear Operation
- Electrical Controls
  - Limit Switches
  - Torque Switches
- Maintenance and Troubleshooting
  - Preventive Maintenance
  - Troubleshooting

Maintenance

Pneumatic Control

Description:

The Pneumatic Controls training program, or unit, is designed to familiarize trainees with the basic operation, maintenance, and calibration of components in a pneumatic control system. After completing this program, the trainees should be able describe to how to service the various devices that help dry and filter the air and how to check pressure control devices in the system for proper operation. They should also be able to describe the basic operation and maintenance of some typical control components in a pneumatic system.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPPC

Objectives:

- Describe the operation and maintenance of air supply components that dry and filter compressed air in a pneumatic control system.
- Describe the operation and maintenance of pressure control components in a pneumatic control system.
- Describe the operating principles of pneumatic control components.
- Identify the basic types of pneumatic sensor-transmitters.
- Describe the operation and maintenance of sensor-transmitters.
- Identify and describe common types of pneumatic receiver-controllers.
- Describe basic calibration procedures for a typical receiver-controller.
- Identify and describe common types of pneumatic actuators.
- Describe procedures involved in testing, calibrating, and maintaining pneumatic actuators.

Content:

- Air Supply Maintenance
    - Air Filtering
    - Pressure Control
- Control Components
    - Basic Operation
    - Sensor-Transmitters
    - Receiver-Controllers
    - Actuators

Maintenance

Principles of Controllers

Description:

The Principles of Control training program, or unit, is designed to familiarize trainees with the basic operating principles of controllers used with discrete input/output devices and analog input/output devices. After completing this program, the trainees should be able to explain the control logic used in systems with discrete (digital) I/O, describe how to troubleshoot systems that use individual relays and solid state controllers, and describe how to program a PLC and troubleshoot PLC system problems. They should also be able to explain how analog variables can be converted to digital data and vice-versa, describe PID control, describe common controller options and applications, and describe how to diagnose problems in single and multiple control loops.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCCO

Objectives:

- Explain the control logic used in systems with discrete (digital) I/O.
- Describe how to troubleshoot systems that use individual relays and solid state controllers.
- Describe how to program a PLC, test the program, run and adjust the program, and troubleshoot PLC system problems.
- Explain how analog variables can be converted to digital data and vice-versa.
- Describe proportional control, derivative control, and integral control.
- Describe common controller options and applications.
- Diagnose problems in single and multiple control loops.

Content:

- Controllers Used with Discrete I/O
    - Digital Logic
    - Individual Relays
    - PLC Applications
- Controllers Used with Analog I/O
    - Analog/Digital Conversion
    - PID Control
    - Special Controller Features
    - Troubleshooting Control Loops

Maintenance

Smart Controllers

Description:

The Smart Controllers training program, or unit, is designed to familiarize trainees with the operation and use of smart controllers. After completing this program, the trainees should be able to describe basic procedures for installing, configuring, operating, and tuning smart controllers.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPSC

Objectives:

- Describe the purpose of a smart controller.
- Describe a smart controller's common control options.
- Explain how to install and wire a new or replacement smart controller.
- Explain how to configure a smart controller.
- Explain how to operate a smart controller.
- Explain how to tune a smart controller for optimum performance.
- Describe the procedures for troubleshooting a single loop process controlled by a smart controller.
- Describe the procedures for tuning a single loop process controlled by a smart controller.

Content:

- Setting Up Smart Controllers
  - Characteristics
  - Installation and Configuration
- Using Smart Controllers
  - Operation and Tuning
  - Demonstration

Maintenance

Troubleshooting of AC Motor Controllers

Description:

This interactive training unit is designed to familiarize trainees with basic procedures for troubleshooting and maintaining AC motor controllers. After completing this unit, trainees should be able to use diagrams and charts to obtain information about an AC motor controller. They should also be able to explain how to troubleshoot a problem in an AC motor controller and how to inspect and clean a controller's parts.

Duration:
2 hours

Course Code:
IHRDC_OM_AEEA2

Objectives:

- **Introduction**
  - Explain how to use a schematic diagram to obtain information about the operation of an AC motor controller.
  - Explain how to use a wiring diagram to locate the components in an AC motor controller.
  - Describe a typical legend and a typical sequencing chart.
  - Describe a basic procedure for troubleshooting an AC motor controller.
  - Identify and describe typical sources of information about the normal operation of an AC motor controller.
  - Identify and describe possible sources of information about an AC motor controller malfunction.
  - Describe how to use a schematic diagram to diagnose an AC motor controller malfunction.
- **Troubleshooting**
  - Describe how a voltage tester can be used to locate a malfunction in an energized AC motor controller.
  - Describe how to test an AC motor controller to determine if it is de-energized.
  - Describe how a megohmmeter can be used to

Content:

- Introduction
  - Diagrams and Charts
  - Procedures
- Troubleshooting
  - Energized Controllers
  - De-Energized Controllers
- Maintenance
  - Cleaning
  - Inspection

Maintenance

Introduction to Distributed Control Systems

Description:

The Introduction to Distributed Control Systems training program, or unit, is designed to familiarize trainees with DCS architecture and basic tasks that DCS technicians may be asked to perform. After completing this program, the trainees should be able to describe the architectural organization of DCS field components, central components, and control loops. They should also be able to describe ways that a DCS technician typically works with a DCS.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPID

Objectives:

- Explain the functions of input and output devices.
- Describe the difference between digital and analog I/O devices.
- List examples of I/O field devices.
- Describe how I/O devices communicate.
- Identify I/O devices from a piping and instrument diagram.
- Describe typical I/O field termination equipment.
- Describe typical I/O and control processor cards and functions.
- Explain the data functions of the system server.
- Explain how to use a DCS user interface for basic information retrieval.
- Describe DCS networks.
- Explain why and how PLCs are sometimes part of a DCS.
- Describe typical control loops.
- Describe the information that can be obtained from loop sheets.
- Describe preparations for working on a field device.
- Describe basic service operations that may have to be performed on a field device.
- Identify troubleshooting tasks that can be performed in a rack room.
- Identify tasks that can be performed at a DCS us

Content:

- DCS Architecture
  - Field Components
  - Central Components
  - Control Loops
- Working with a DCS
  - Field Device Tasks
  - Rack Room Tasks
  - At the User Interface

Maintenance

Troubleshooting DCS I/Os: Practices

Description:

The Troubleshooting DCS I/Os: Practices training program, or unit, is designed to familiarize trainees with some practical applications of basic procedures for troubleshooting the inputs and outputs of a distributed control system. After completing this program, the trainees should be able to explain how to troubleshoot problems in digital I/O devices that are part of a DCS, analog I/O devices that are part of a DCS, and miscellaneous I/O components of a DCS.

Duration:
2 hours

Course Code:
IHRDC_OM_ACPTP

Objectives:

- Describe basic steps for troubleshooting a problem in a digital I/O device that is part of a DCS.
- Describe basic steps for troubleshooting a problem in an analog I/O device that is part of a DCS.
- Describe basic steps for troubleshooting a problem in a miscellaneous I/O component of a DCS.

Content:

- Troubleshooting Practices
    - Troubleshooting Digital I/O Devices
    - Troubleshooting Analog I/O Devices
    - Troubleshooting Miscellaneous I/O Components

Maintenance

Troubleshooting DCS I/Os: Procedures

Description:

The Troubleshooting DCS I/Os: Procedures training program, or unit, is designed to familiarize trainees with basic procedures for troubleshooting the inputs and outputs of a distributed control system. After completing this program, the trainees should be able to explain how to gather information about a DCS I/O problem, identify possible causes of the problem, test the possible causes, and finish up the troubleshooting procedure.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPTD

Objectives:

- Explain how to gather information about a DCS I/O problem.
- Explain how to eliminate possible causes of a DCS I/O problem.
- Explain how to prioritize possible causes of a DCS I/O problem.
- Explain how to test possible causes of a DCS I/O problem in a logical order.
- Explain how to complete the procedures for troubleshooting a DCS I/O problem.

Content:

- Troubleshooting Procedures
    - Investigating Symptoms
    - Identifying Possible Causes
    - Testing Possible Causes
    - Finishing Up

Maintenance

Field Devices: Analog Configuration

Description:

The CONTINUOUS PROCESS: Field Devices - Analog Configuration training program, or unit, is designed to familiarize trainees with basic procedures for configuring traditional and "smart" analog field devices. After completing this program, the trainees should be able to explain how to set zero and span and perform a calibration procedure on a traditional analog transmitter. They should also be able to explain the basics of how to configure a smart analog field device using a portable communicator or a laptop PC.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPCA

Objectives:

- Define "analog" as it relates to process control signals.
- Explain how analog field devices function in process control systems.
- Explain how to set zero and span on a traditional electronic transmitter.
- Explain how to perform a calibration procedure on a non-smart transmitter.
- Explain the relationship between the value of a process variable and a transmitter's 4-20 milliamp output signal.
- Identify the basic configuration parameters for smart transmitters.
- Calculate a process measurement from a smart transmitter's analog signal output.
- Explain how to configure a smart field devices with a portable communicator.
- Explain how to configure a smart field device with a laptop PC.

Content:

- Analog Field Devices
  - Analog Field Devices
  - Traditional Electronic Devices
  - Configuring Smart Devices
- Configuration Methods
  - Portable Communicators
  - Laptop PCs

Maintenance

Field Devices: Configuring with a Laptop PC

Description:

The Field Devices - Configuring with a Laptop PC training program, or unit, is designed to familiarize trainees with basic procedures for using a laptop PC to configure analog field devices. After completing this program, the trainees should be able to explain how to configure an input device such as a transmitter and an output device such as a control valve.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPCL

Objectives:

- Use Foxboro's PC-10 program to configure a transmitter.
- Use Foxboro's PC-20 program to configure a control valve.

Content:

- Configuring Input Field Devices
  - Configuring a Transmitter
- Configuring Output Field Devices
  - Configuring a Control Valve

Maintenance

Field Devices: Digital Configuration with a DCS

Description:

The CONTINUOUS PROCESS: Field Devices - Digital Configuration with DCSs training program, or unit, is designed to familiarize trainees with basic procedures for using a distributed control system (DCS) to configure digital field devices. After completing this program, the trainees should be able to explain how to use the Honeywell TDC 3000 and the Fisher-Rosemount DeltaV to configure a digital field device.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPCD

Objectives:

- Explain how digital field devices differ from analog field devices.
- Describe how a DCS is used to monitor and control a process.
- Identify and describe the information that is provided on the point detail screens of a typical DCS.
- Describe a basic procedure for using a DCS to configure a digital field device.
- Describe the basic operating principles and architecture of fieldbus technology.
- Describe a basic procedure for using the DeltaV to configure a field device.

Content:

- The DCS
  - Digital Field Devices
  - Distributed Control Systems
- Honeywell TDC 3000
  - Point Details
  - Configuration of Digital Field Devices
- Fisher Rosemount DeltaV
  - Fieldbus Technology
  - DeltaV Digital Configuration

Maintenance

The Human-Machine Interface

Description:

The Human-Machine Interface training program, or unit, is designed to familiarize trainees with the different types of HMIs that are likely to be found in a modern plant. After completing this program, the trainees should be able to obtain process information using typical instruments, operate typical switch controls, use smart I/O devices and controller interfaces, and perform common computer operations.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCHM

Objectives:

- Read typical instruments.
- Use typical switch controls.
- Configure smart I/O devices.
- Operate portable instruments.
- Operate and program a variable frequency drive.
- Take readings from and program a loop controller.
- Use dedicated graphics terminals.
- Describe the role of software in computer operation.
- Describe the main functional components of a computer.
- Use common DOS and character-based keyboard/screen functions.
- Use common GUI keyboard/screen functions.
- Turn a computer on and log on.
- Find and run a program, enter data, save, print, exit, and shut down a computer.

Content:

- Traditional Equipment Interfaces
  - Instruments
  - Controls
- Microprocessor-Based HMIs
  - Smart I/O Interfaces
  - Controller Interfaces
- The Computer Interface
  - Basic Computer Hardware and Operation
  - The Human-Computer Interface
  - Common Computer Operations

Maintenance

Human-Machine Interface and Troubleshooting

Description:

The PLCs: HMIs and Troubleshooting training program, or unit, is designed to familiarize trainees with human-machine interfaces and how they can be used in the troubleshooting of programmable logic controller system problems. After completing this program, the trainees should be able to identify various types of HMIs and explain how they are connected and used. They should also be able to describe the five steps of troubleshooting and explain how to use those steps and an HMI to troubleshoot a problem in a PLC system.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLMT

Objectives:

- Identify common types of HMIs.
- List different ways to connect an HMI to a PLC.
- Describe some basic factors involved in using a PC-based HMI.
- Explain why it is important to know the equipment before you start to troubleshoot.
- List the aids available to you in investigating the symptoms.
- Explain how to use the half-splitting method of identifying symptoms.
- Explain how to prioritize and eliminate possible causes.
- Explain the importance of determining root causes of malfunctions.
- Explain how to use an HMI and the five-step troubleshooting process to troubleshoot a PLC-controlled system.

Content:

- The Human-Machine Interface
    - Types of HMIs
    - Connection to the PLC
    - Using an HMI
- The Five Steps of Troubleshooting
    - Know the Equipment
    - Investigate Symptoms
    - List Probable Causes
    - Test Probable Causes
    - Discover Root Causes
    - A Troubleshooting Case Study

Maintenance

Plant Protection Equipment and Integrated Systems

Description:

In this unit, trainees will learn what logic diagrams are and how they are used to represent the functions carried out by plant protection equipment. Common types of logic gates are identified and described, and interlock logic is examined. The unit also describes how logic diagrams can be used to represent conditions that cause boiler trips, turbine trips and generator trips, and it explains how the protection systems for boilers, turbines and generators are interrelated.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPI

Objectives:

- **Logic Diagrams**
  - Describe what logic diagrams are and how they can be used to represent functions carried out by plant protection equipment.
  - Describe the functions of AND gates, OR gates, NOT gates and time delay (TD) gates in logic circuits.
  - Describe what interlocks are and how the actions of interlocks associated with boiler operations are represented in logic diagrams.
- **Trip Logic**
  - Describe how logic diagrams can be used to represent conditions that cause equipment trips.
  - Identify conditions that can cause a boiler trip and describe how a logic diagram can be used to illustrate those conditions.
  - Identify conditions that can cause a turbine trip and describe how a logic diagram can be used to illustrate those conditions.
  - Identify conditions that can cause a generator trip and describe how a logic diagram can be used to illustrate those conditions.
  - Describe how the prot

Content:

- Logic Diagrams
  - Overview
  - Logic Gates
  - Interlock Logic
- Trip Logic
  - Boiler Trips
  - Turbine Trips
  - Generator Trips
  - Integrated Protection

Maintenance

Digital and Analog Oscilloscopes

Description:

The Digital and Analog Oscilloscopes training program, or unit, is designed to familiarize trainees with the basic operation and use of digital and analog oscilloscopes. After completing this program, the trainees should be able to explain what an oscilloscope does, explain how to set up an oscilloscope for use, identify the controls used to adjust an oscilloscope display, and explain how to use an oscilloscope to make voltage measurements and time measurements.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCDA

Objectives:

- Briefly explain how an oscilloscope converts a voltage input to an on-screen trace.
- Describe how an oscilloscope display is graduated.
- Explain why proper grounding is important.
- Explain how to set the controls to "standard position" for the initial setup of an oscilloscope.
- Explain how to select, compensate, and use oscilloscope probes.
- Identify the controls used to adjust an oscilloscope display and explain their functions.
- Explain what an oscilloscope's vertical controls do and how to use them.
- Explain what an oscilloscope's horizontal controls do and how to use them.
- Determine an applied voltage by counting oscilloscope screen divisions.
- Determine frequency by measuring the period on an oscilloscope screen.
- Determine a pulse width and rise time.

Content:

- Fundamentals
  - Basic Operating Theory
  - Display Fundamentals
- Setting Up
  - Grounding and Safety
  - Controls
  - Probes
- Control Use
  - Display
  - Vertical
  - Horizontal
- Measurement Techniques
  - Voltage
  - Time

Maintenance

Field Devices: Analyzers

Description:

The Field Devices - Analytical training program, or unit, is designed to familiarize trainees with input field devices that perform online analyses. After completing this program, the trainees should be able to describe common applications and procedures that are associated with the use of online analyzers. They should also be able to describe some of the many different types of online analyzers that are used in continuous process systems.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPAF

Objectives:

- Describe common applications of online analytical field devices in continuous process systems.
- Describe the essential components of most online process analyzers.
- Describe general concerns associated with the installation, operation, and maintenance of online analyzers.
- Describe common types of electrochemical analyzers that use property- or compound-specific sensors for online analyses in continuous process systems.
- Describe one type of flammable vapor analyzer that is commonly used in continuous process systems.
- Describe common maintenance concerns associated with electromagnetic analyzers.
- Describe optical analyzers that are commonly used for online analyses in continuous process systems.
- Describe mass spectrometers that are commonly used for online analyses in continuous process systems.
- Describe nuclear devices that are commonly used for online analysis of density.
- Describe common maintenance concerns associated with electromagnetic analyzers.

Content:

- Introduction
  - Typical Applications
  - Basic Concerns
- Types of Online Analyzers
  - Electrochemical Analyzers
  - Electromagnetic Analyzers
  - Chromatographs

Maintenance

Field Devices: Level and Flow

Description:

The Field Devices - Level and Flow training program is designed to familiarize trainees with input field devices that sense and monitor level or flow. After completing this program, the trainees should be able to describe the basic operation of various types of level measurement and flow measurement devices.

Duration:
2 hours

Course Code:
IHRDC_OM_ACPLF

Objectives:

- Define the following terms: level, point level measurement, continuous level measurement, direct level measurement, and indirect level measurement.
- Identify common examples of point, continuous, direct, and indirect level measurement devices.
- Identify factors that determine the type of level measurement device used for a particular application.
- Define the termsdensity, specific gravity, and hydrostatic pressure.
- Describe how pressure gauges, differential pressure transmitters, bubblers, and displacers provide level measurements.
- Describe common applications and limitations associated with pressure gauges, differential pressure transmitters, bubblers, and displacers.
- Describe factors that must be considered during the configuration of pressure gauges, differential pressure transmitters, bubblers, and displacers.
- Describe how capacitance, or radio frequency (RF) devices, and conductance devices measure level.
- Describe common applications

Content:

- Level Measurement
  - Types of Level Measurement
  - Pressure- and Density-Based Devices
  - Capacitance and Conductance Devices
  - Non-Contact Devices
  - Tuning Fork Sensors and Weight Devices
- Flow Measurement
  - Differential Pressure Flowmeters
  - Mechanical Flowmeters
  - Electronic Flowmeters
  - Mass Flowmeters

Maintenance

Field Devices: Pressure, Temperature, and Weight

Description:

The Field Devices - Temperature, Pressure, and Weight training program, or unit, is designed to familiarize trainees with input field devices that sense and monitor temperature, pressure, or weight. After completing this program, the trainees should be able to describe the basic operation of various types of temperature, pressure, and weight transducers and transmitters.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPPT

Objectives:

- List typical temperature, pressure, and weight applications.
- Explain how thermocouples, RTDs, and thermistors work.
- Explain reference junction compensation.
- Explain RTD lead length compensation.
- Explain how load cells work.
- Explain absolute, gauge, and differential pressure measurement.
- Explain the function of set points.
- Describe transmitter operating parameters, and define the following terms: range, LRL, URL, LRV, URV, span, turndown ratio, engineering units, PV, and SV.
- Explain how transmitter accuracy can be specified.
- Identify and describe common transmitter configuration options.
- Describe the ways that transmitters communicate signal information.
- Describe how to set up a traditional transmitter.
- Explain how to communicate with, configure, and test a smart transmitter.

Content:

- Temperature, Pressure, and Weight Inputs
  - Applications
  - Temperature Transducers
  - Pressure and Weight Transducers
  - Sensor Switches
- Signal Equipment
  - Transmitter Characteristics
  - Transmitter Procedures

Maintenance

Field Devices: Using Field Communicators

Description:

The CONTINUOUS PROCESS: Field Devices - Using Field Communicators training program, or unit, is designed to familiarize trainees with basic procedures for using field communicators to configure "smart" analog field devices. After completing this program, the trainees should be able to explain how to configure smart analog transmitters using a HART communicator, a Honeywell communicator, a Yokogawa communicator, and the Foxboro Local Display Module.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPFC

Objectives:

- Explain how to use the HART communicator to perform the basic configuration of a magflow transmitter.
- Explain how to use a Honeywell SFC to perform the basic configuration of a differential pressure transmitter.
- Explain how to use the Yokogawa BT200 to perform the basic configuration of a pressure transmitter.
- Explain how to use the Foxboro Local Display Module to perform the basic configuration of a transmitter.

Content:

- HART Protocol - Magnetic Flow Transmitter
  - Using the HART Communicator
- Honeywell Protocol - Pressure (DP) Transmitter
  - Using the Honeywell Communicator
- Yokogawa Protocol - Pressure Transmitter
  - Using the Yokogawa Communicator
- Foxboro - Local Display Module
  - Using the Foxboro Local Display Module

Maintenance

Introduction to Vibration Analysis

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with measuring and analyzing vibration in rotating equipment. After completing this unit, trainees should be able to explain what vibration is and why it occurs in rotating equipment. They should also be able to describe how to measure vibration using a transducer, a vibration meter, and a vibration analyzer. Additionally, they should be able to explain how to analyze vibration using baseline data, vibration severity charts, and vibration signatures.

Duration:

2 hours

Course Code:

IHRDC_OM_AMVAI

Objectives:

- **Fundamentals**
  - Define vibration.
  - Define terms associated with vibration.
  - Describe characteristics of rotating equipment that are associated with vibration.
  - Describe causes of vibration in rotating equipment.
- **Measuring Vibration**
  - Define transducer.
  - Describe considerations associated with using a transducer.
  - Describe how a typical vibration meter can be used in vibration analysis.
  - Describe how a typical portable vibration analyzer can be used in vibration analysis.
  - Describe how a typical computer-based vibration analyzer can be used in vibration analysis.
- **Analyzing Vibration**
  - Describe how information about a vibration's characteristics can be used to analyze the vibration.
  - Describe how baseline data can be used in vibration analysis.
  - Describe how to use a vibration severity chart.
  - Describe how a vibration si

Content:

- Fundamentals
  - Characteristics of Vibration
  - Vibration and Rotating Equipment
- Measuring Vibration
  - Basic Concepts
  - Vibration Severity Charts
  - Vibration Signatures

Maintenance

Measurement of Concentration

Description:

This interactive training unit is designed to introduce trainees to some information about analytical variables and to some methods for measuring concentration in liquids and gases. After completing this unit, trainees should be able to define five analytical variables that are commonly measured in plants, and explain how and why analytical variables are measured. They should also be able to describe the basic operation of several different types of analyzers that can be used to measure liquid and gas concentrations.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIMC

Objectives:

- **Introduction to Analytical Measurement**
  - State the general purpose of analytical measurements.
  - Define: concentration, density, clarity, humidity, moisture, and analyzer.
- **Liquid Concentration Analysis**
  - Explain what pH measurements represent.
  - Explain how a pH scale is structured and how to interpret pH values.
  - Describe the basic operation of a typical pH analyzer and a typical electrical conductivity measuring device.
- **Gas Concentration Analysis**
  - Describe the basic operation of a paramagnetic oxygen analyzer, a thermal conductivity gas analyzer, and a chromatograph.

Content:

- Introduction to Analytical Measurement
  - Analytical Variables; Measuring Analytical Variables
- Liquid Concentration Analysis
  - What is Concentration?
  - pH Measurements; pH Analyzer Operation; Conductivity Measurements
- Gas Concentration Analysis
  - Oxygen Concentration Measurement; Non-Oxygen Gas Concentration Measurement; Complex Gas Concentration Measurement

Maintenance

Measurement of Density, Clarity, and Moisture

Description:

This interactive training unit is designed to introduce trainees to some devices that can be used to measure density, clarity, and moisture. After completing this unit, trainees should be able to define various terms associated with density, clarity, and moisture, and describe the basic operation of devices used to measure density, clarity, humidity, and moisture.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIDC

Objectives:

- **Density Measurement**
  - Define density.
  - Explain the difference between density and specific gravity.
  - Describe the basic operation of a hydrometer.
  - Describe the use of a bubbler system to measure density.
  - Describe the operation of a radioactive density analyzer.
- **Clarity Measurement**
  - Define clarity.
  - Describe the basic operation of a colorimeter, a turbidity meter, and an opacity meter.
- **Moisture Measurement**
  - Define humidity and moisture.
  - Describe the basic operation of a sling psychrometer.
  - Describe the basic operation of a wet and dry bulb recording psychrometer.
  - Describe the basic operation of a hygrometer.
  - Describe the basic operation of an infrared moisture analyzer.

Content:

- Density Measurement
  - Density and Specific Gravity; Hydrometers
  - Density Bubbler System; Radioactive Density Analyzer
- Clarity Measurement
  - Principles of Clarity Analysis; Colorimeter
  - Turbidity Meter; Opacity Meter
- Moisture Measurement
  - Humidity and Moisture; Measuring Humidity; Measuring Moisture

Maintenance

Measurement of Level and Flow

Description:

This interactive training unit is designed to introduce trainees to instruments that measure level and flow. After completing this unit, trainees should be able to explain what level is and describe the basic operation of various direct and indirect level measurement devices. They should also be able to explain what fluid flow, flow rate, and total flow are and describe some common examples of direct and indirect flow measurements.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIML

Objectives:

- **Level Measurement**
  - Define: level, continuous level measurement, and single-point level detection.
  - Describe basic operation of the following level measurement devices: plumb bob, gauge glass, float and tape, and conductivity probes.
  - Describe the basic operation of these level measurement devices: pressure gauge, bubbler system, and D/P cell.
- **Flow Measurement**
  - Define fluid flow, flow rate, and total flow.
  - List basic units of measurement for flow rate.
  - Describe common examples of direct flow measurement.
  - Describe common examples of indirect flow measurement.

Content:

- Level Measurement
  - Principles of Level Measurement
  - Direct Level Measurement Devices
  - Indirect Level Measurement Devices
- Flow Measurement
  - Principles of Flow Measurement
  - Direct Flow Measurement Devices
  - Indirect Flow Measurement Devices

Maintenance

Measurement of Pressure and Temperature

Description:

This interactive training unit is designed to introduce trainees to some of the fundamental aspects of process variable measurement and to some of the basic instruments used for pressure and temperature measurement. After completing this unit, trainees should be able to describe the function of process instrumentation and how to obtain accurate readings from instruments such as gauges, indicators, and recorders. They should also be able to explain what pressure and temperature are and how they are expressed, and the operation of several pressure and temperature measuring devices.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIMP

Objectives:

- **Measuring Process Variables**
  - State the general function of process instrumentation.
  - List four process variables monitored by process instrumentation.
  - Explain how parallax can affect an instrument reading.
  - Explain how to use a multiplication factor when reading an instrument.
  - Describe how to read gauges, indicators, recorders, and digital meters.
- **Pressure Measurement**
  - Define pressure in terms of solids, liquids, and gases.
  - Describe three types of scales used to indicate pressure.
  - List basic units of measurement for pressure.
  - Describe three types of manometers.
  - Describe the basic operation of Bourdon tube, bellows, and diaphragm pressure elements.
  - Describe the basic operation of a pressure transmitter.
- **Temperature Measurement**
  - Explain the general relationship between heat and temperature.
  - List basic units

Content:

- Measuring Process Variables
  - Process Variables and Instrumentation
  - Reading Instruments
- Pressure Measurement
  - Pressure and Pressure Scales
  - Manometers
  - Pressure Elements and Transmitters
- Temperature Measurement
  - Temperature and Temperature Scales
  - Thermometers
  - Thermocouples and RTDs
  - Measurement of Level and Flow

Maintenance

Principles of Calibration

Description:

The Principles of Calibration training program, or unit, is designed to familiarize trainees with the basic principles associated with the calibration of input field devices and control loops. After completing this program, the trainees should be able to explain how to test, adjust, and calibrate various types of gauges and transmitters. They should also be able to explain how to test, set up, and adjust input field devices and calibrate control loops.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCCA

Objectives:

- Explain how to decide the best time to test and calibrate.
- Describe the proper steps involved in a lockout/tagout procedure.
- Describe how to perform basic calibration procedures on a typical pressure gauge, pressure transmitter, and thermocouple.
- Describe how to adjust a typical sensor that switches in response to discrete position.
- Describe how to test and adjust a typical sensor that switches at a temperature, pressure, or control signal set point.
- Describe how to test and calibrate a typical sensor that responds to concentrations.
- Describe how to test, set up, and adjust a typical sensor that responds to flow.
- Describe how to perform basic calibration procedures on a typical output field device.
- Describe how to perform basic calibration procedures on a typical control loop.

Content:

- Gauges and Transmitters
    - Preparation
    - Pressure Gauge
    - Pressure Transmitter
    - Temperature Devices
- Field Devices and Control Loops
    - Input Field Devices
    - Output Device and Loop Calibration

Maintenance

Fiber Optic Systems

Description:

The NETWORKS: Fiber Optic Systems training program, or unit, is designed to familiarize trainees with the basic operating principles of fiber optic systems and some of the basic installation and testing methods. After completing this program, the trainees should be able to describe characteristics of glass fibers and describe the function and types of fiber optic connectors. They should also be able to describe basic procedures for installing and testing fiber optics.

Duration:

2 hours

Course Code:

IHRDC_OM_ACNFO

Objectives:

- Describe the composition of a common glass fiber.
- Describe characteristics of multi-mode fiber.
- Describe characteristics of single-mode fiber.
- Describe characteristics of optic fibers and cables.
- Describe the function and types of fiber optic connectors.
- Describe hazards and work precautions associated with fiber optics.
- List the main steps associated with running a new fiber optic drop.
- Describe steps that are commonly used to terminate fiber.
- Describe steps that are commonly used to make fiber splices.
- Describe steps that can be used to check newly installed fibers.

Content:

- Operating Principles
    - Glass Fibers
    - Basic System Hardware
- Installation Tasks
    - Safety
    - Installing Cable
    - Terminations and Splices

Maintenance

Introduction to Control and Data Systems

Description:

The Introduction to Control and Data Systems training program, or unit, is designed to familiarize trainees with the role of information systems in plant operations and the elements of modern information systems. After completing this program, the trainees should be able to identify the information needs of typical plant functional elements and explain how information gets into an information system. They should also be able to describe system architecture and explain how to use environment software and application software.

Duration:

2 hours

Course Code:

IHRDC_OM_ACCIC

Objectives:

- List the information needs of typical plant functional elements.
- Explain how alarms work in modern plants.
- List the routes by which information gets into the system.
- Explain I/O bus, LAN, WAN, client-server, and the role of network standards.
- Explain the function of an operating system.
- Describe the characteristics of common operating systems.
- Explain the role of operating system and network software.
- Explain virtual instrumentation.
- Explain programmable logic controller (PLC) program creation.
- Describe how to use graphical objects to create the system data structure and HMI.
- Describe password hierarchy and the need for security.
- Describe the functions and architecture of a SCADA system.

Content:

- Information and Plant Operations
    - Information Needs
    - Information Sources
- Information Systems
    - System Architecture
    - Environment Software
    - Application Software

Maintenance

Introduction to Networks

Description:

The NETWORKS: Introduction training program, or unit, is designed to familiarize trainees with some different types of control systems and some basic concepts that apply to control system networks. After completing this program, the trainees should be able to describe the layout and operation of traditional non-networked control systems and the layout and operation of some common networked control systems. They should also be able to describe factors that can affect the speed at which signals can be sent across a network, describe the various levels of network protocol, and describe common physical network layouts, or topologies.

Duration:

2 hours

Course Code:

IHRDC_OM_ACNIN

Objectives:

- Describe the layout and operation of traditional non-networked control systems.
- Describe the layout and operation of some common networked control systems.
- Describe how information is coded as digital data for network transmission.
- Identify and describe factors that can affect the speed at which signals can be sent across a network.
- Identify and describe the various levels, or layers, of network protocol (the rules that govern how a network functions).
- Identify and describe common physical network layouts, or topologies
- Identify common protocols used in network control systems.

Content:

- Control Systems Overview
    - Non-Networked Systems
    - Networked Systems
- Basic Network Concepts
    - Digital Data
    - Network Speed and Traffic
    - Network Protocol and Topology
    - Common Protocol Types

Maintenance

Setting Up and Troubleshooting Networks

Description:

The NETWORKS: Setting Up and Troubleshooting training program, or unit, is designed to familiarize trainees with basic concepts that apply to setting up and troubleshooting control networks. After completing this program, the trainees should be able to describe different types of cables and connectors that are used to link together devices in control networks. They should also be able to describe basic procedures for installing, testing, and troubleshooting control networks.

Duration:

2 hours

Course Code:

IHRDC_OM_ACNST

Objectives:

- Describe coaxial cable and explain how to install a connector onto the cable.
- Describe common types of twisted pair cable and explain how to install connectors onto the cables.
- Identify and describe factors that must be considered when cable is routed.
- Describe how to connect and use a cable tester to perform various tests on network cabling.
- Describe common hardware configuration procedures that need to be performed during network installation.
- Describe common troubleshooting techniques that are helpful for identifying problems with network cabling and devices.

Content:

- Cables and Connectors
    - Coaxial Cable
    - Twisted Pair Cable
- Network Installation
    - Cable Routing
    - Circuit Testing
    - Hardware Configuration
    - Troubleshooting

Maintenance

Automatic Process Control 1

Description:

This interactive training unit is designed to familiarize trainees with basic concepts associated with automatic control of process systems. After completing this unit, trainees should be able to describe the functions of the four basic elements of an automatic process control system and explain how a process disturbance can affect a process control system. They should also be able to explain how feedback control and feedforward control can be used in process control systems. In addition, trainees should be able to explain how resistance, capacitance, dead time, and lag time can affect a process control system.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIA1

Objectives:

- **Control Methods**
  - State the function of a process control system.
  - Describe the functions of the four basic elements of an automated process control system.
  - Explain what a process disturbance is and how it can affect a process control system.
  - Describe feedback and feedforward control and explain how they can be used in a process control system.
- **Process Dynamics**
  - Define resistance and capacitance.
  - Define dead time and lag time.
  - Explain how resistance, capacitance, dead time, and lag time can affect a process control system.

Content:

- Control Methods
  - Automatic Control Systems
  - Feedback Control
  - Feedforward Control
- Process Dynamics
  - Process Characteristics
  - System Responses

Maintenance

Automatic Process Control 2

Description:

This interactive training unit is designed to familiarize trainees with control modes used with automatic process control systems. After completing this unit, trainees should be able to describe two-position control, proportional control, reset control, rate control, and PID control and explain how each of these control modes works in a control system. They should also be able to explain how proportional band applies to a control system.

Duration:

2 hours

Course Code:

IHRDC_OM_AOIA2

Objectives:

- **Two-Position and Proportional**
  - Describe two-position control and explain how it works in a control system.
  - Describe proportional control and explain how it works in a control system.
  - Explain how proportional band applies to a control system.
- **Reset, Rate, and PID**
  - Describe reset control and explain how it works in a control system.
  - Describe rate control and explain how it works in a control system.
  - Describe PID control and explain how it works in a control system.

Content:

- Two-Position and Proportional
  - Two-Position Control
  - Proportional Control
  - Proportional Band
- Reset, Rate, and PID
  - Reset Control
  - Rate Control
  - PID Control

Multiple Loop Control

Description:

The Multiple Loop Control training program, or unit, is designed to familiarize trainees with the basic operation and use of multiple loop control. After completing this program, the trainees should be able to explain the basic operation of multiple single loops, cascade control, ratio control, feedforward control, and special connections that are used with multiple loop control. They should also be able to use a P & ID to trace boiler control functionality.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPML

Objectives:

- Explain typical interactions between single control loops.
- Explain several types and applications of cascade control.
- Explain several types and applications of ratio control.
- Describe computational components that are typically used in multiple loop control.
- Explain how limiters, interlocks, override controls and selective controls are used.
- Explain the difference between feedback control and feedforward control.
- Describe the advantages, problems, and applications of feedforward control.
- Identify the main boiler control components and connections on a P & ID.
- Trace boiler control functionality.

Content:

- Multiple Loop Applications
  - Multiple Single Loops
  - Cascade Control
  - Ratio Control
  - Special Multiple Loop Connections
  - Feedforward Control
- Boiler Master Controls
  - P & ID Conventions and Symbology
  - Boiler Control Operation

Maintenance

Principles of Process Control

Description:

The Principles training program, or unit, is designed to familiarize trainees with some of the basic material, process, and system characteristics that can affect process control. After completing this program, the trainees should be able to identify and describe some basic factors that affect process control. They should also be able to describe common process control methods and the operation of loops that control critical process variables.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPCR

Objectives:

- Identify variables that are routinely monitored and controlled by process control systems.
- Describe basic material properties and fluid flow characteristics.
- Describe the relationship between temperature and pressure in fluids.
- Describe the basic principles and methods of heat transfer.
- Identify and describe some basic factors that affect process control.
- Describe on/off, proportional, integral (reset), derivative (rate), and PID control algorithms.
- Identify and describe pressure, temperature, level, flow, and pH control loops in a typical boiler system.

Content:

- Process Characteristics
- Example System Layout
- Material Attributes
- Control Systems
- Basic Control Factors
- Process Control Methods
- Process Control Loops

Maintenance

Single Loop Control

Description:

The Single Loop Control training program, or unit, is designed to familiarize trainees with the basic operation and use of single control loops. After completing this program, the trainees should be able to explain the basic operation of a feedback control loop, describe how the proportional-integral-derivative (PID) control algorithm works, and identify and describe features that may be used to enhance the performance of a PID controller.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPSL

Objectives:

- Describe a typical feedback control loop.
- Describe how the proportional-integral-derivative (PID) control algorithm works.
- Identify and describe features that are commonly used to enhance the performance of a PID controller.
- Describe a typical single-loop pressure control system.
- Describe a typical single-loop temperature control system.
- Describe a typical single-loop level control system.
- Describe a typical single-loop flow control system.
- Describe a typical single-loop pH control system.

Content:

- Control Basics
    - Feedback Control Loop
    - PID Control
    - Controller Enhancements

Maintenance

Troubleshooting Loops

Description:

The Troubleshooting Loops training program, or unit, is designed to familiarize trainees with basic procedures for troubleshooting control loop problems. After completing this program, the trainees should be able to explain how to use a systematic troubleshooting procedure to troubleshoot problems in control loops.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPTS

Objectives:

- Explain how to gather information about a control loop problem.
- Explain how to eliminate components or functional elements as possible causes of a control loop problem.
- Explain how to prioritize possible causes of a control loop problem.
- Explain how to test possible causes of a control loop problem in a logical order.
- Describe the steps that should be taken to complete the troubleshooting of a control loop problem.
- Describe a basic procedure for troubleshooting a discrete control loop.
- Describe a basic procedure for troubleshooting a single analog control loop.
- Describe considerations in troubleshooting a multiloop control system.

Content:

- The Troubleshooting Procedure
  - Investigating Symptoms
  - Identifying Possible Causes
  - Testing Possible Causes
  - Finishing Up
- Loop Troubleshooting Examples
  - Discrete Loop
  - Single Control Loop
  - Multiloop Control

Maintenance

Tuning Loops

Description:

The Tuning Loops training program, or unit, is designed to familiarize trainees with the basic principles of tuning control loops. After completing this program, the trainees should be able to describe how to prepare for tuning a loop and how to tune a loop manually using a systematic trial and error method, the Ziegler-Nichols open loop method, and the Ziegler-Nichols closed loop method. They should also be able describe how tuning can be accomplished by the auto-tune function, by artificial intelligence features, and by tuning software.

Duration:

2 hours

Course Code:

IHRDC_OM_ACPTL

Objectives:

- Describe tuning in relation to loop response.
- Describe the types of process upsets.
- Explain process delays.
- Describe the effects of gain, reset, and rate on response curves.
- Explain how to identify and assess asymmetry, non-linearity, and noise.
- Explain how to correct or reduce hysteresis, stiction, and noise.
- Distinguish between random tuning and systematic trial and error tuning.
- Describe the precautions necessary when tuning by trial and error.
- Explain the procedure for tuning using the Z-N open loop method.
- Explain the procedure for tuning using the Z-N closed loop, or ultimate gain, method.
- Describe how the auto-tune function tunes.
- Describe artificial intelligence (fuzzy logic) tuning features.
- Explain how to connect and run tuning programs.
- Describe the options tuning programs may provide.

Content:

- Closed Loop Operation
  - Control Loop Response
  - Before Tuning
- Manual Tuning
  - Trial and Error Tuning
  - Ziegler-Nichols Tuning Methods
- Automated Tuning
  - Self-Tuning
  - Software Tuning

Maintenance

Architecture, Types, and Networks of PLCs

Description:

The PLCs: Architecture, Types and Networks training program, or unit, is designed to familiarize trainees with the basic operation and components of programmable logic controllers (PLCs). After completing this program, the trainees should be able to explain what a PLC does, identify and describe PLC components, and explain how PLCs communicate.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLAT

Objectives:

- Explain how PLCs can be used to replace conventional, hard-wired ladder diagrams.
- Explain how PLC programs can be used to control machines and processes.
- Identify the three main parts of a PLC system.
- Recognize a processor for a PLC and describe its functions.
- Recognize different types of input modules.
- Explain how to wire input devices into input modules.
- Recognize different types of output modules.
- Explain how to wire output devices into output modules.
- Recognize power supplies.
- Recognize different types of programming terminals.
- Identify the three main time periods of the PLC scan cycle.
- Identify factors that can affect the scan cycle time of a PLC.
- Recognize different types of PLC networks.
- List devices that typically communicate across different types of PLC networks.
- Recognize that automated networks may include methods of machine control other than PLCs.

Content:

- PLC Operations
  - Basic PLC Concepts
  - System Components
  - The Processor
  - The Input System
  - The Output System
  - Other Components
- The PLC Scan
  - The PLC Scan Cycle
  - Scan Time
- How PLCs Communicate
  - Networking PLCs
  - Other Methods of Machine Control

Maintenance

I/O Communication

Description:

The PLCs: I/O Communication training program, or unit, is designed to familiarize trainees with the various ways in which real-world devices can be connected to the input and output systems of a programmable logic controller. After completing this program, the trainees should be able to identify various types of I/O modules and field devices, and explain how direct I/O connections are made. They should also be able to identify some common device networks and identify some devices, other than PLC devices, that you might find on a typical device network.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLIO

Objectives:

- Identify the pieces of hardware that make up a PLC rack.
- Differentiate between serial and parallel communication between racks.
- Identify the three types of I/O modules.
- Describe a typical I/O addressing scheme.
- Describe the differences between discrete, or bit, devices; word devices; and analog field devices.
- Describe the difference between sinking and sourcing I/O modules.
- Explain why proper fusing, shielding and grounding are important when field devices are wired.
- Relate I/O modules to the input and output image tables, and to the scan cycle.
- Identify some common proprietary and non-proprietary device networks.
- Identify some devices, other than PLC devices, that you might find on a typical device network.

Content:

- Direct I/O Connections
  - How I/O Modules Are Mounted
  - I/O Module Types
  - I/O Module Addressing
  - Field Devices
  - Field Wiring
  - I/O Data Processing
- Networked I/O Modules
  - Types of Device Networks
  - Devices

Maintenance

Installing and Maintaining PLCs

Description:

The PLCs: Installing and Maintaining training program, or unit, is designed to familiarize trainees with the basic procedures involved in installing and setting up PLC equipment. After completing this program, the trainees should be able to explain how to mount and wire up PLC hardware. They should also be able to describe how to establish communications between a PC and a PLC, clear the processor memory, and initially configure the processor.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLIM

Objectives:

- Describe what must be taken into consideration when mounting PLC hardware.
- Describe how to connect various types of PLC power supplies.
- Explain why emergency stop circuits must be hardwired.
- Explain what to be aware of when populating PLC chassis.
- Describe what to be aware of when wiring I/O field devices.
- Describe what to be aware of when making network connections.
- Explain how to establish communication between a PLC and a PC.
- Explain the steps necessary to clear the memory of a PLC.
- Explain the steps necessary to perform the initial configuration of a PLC.

Content:

- Installing the PLC
  - Mounting PLC Chassis
  - Power Supplies and Connections
  - E-Stop Circuits
  - Configuring and Populating the Chassis
  - I/O Wiring
  - Network Connections
- Initial Configuration
  - Establishing Communications
  - Clearing Memory
  - Performing Initial Configuration

Maintenance

Introduction to Digital Logic

Description:

"Logic" is a word used to describe things or events that are predictable because a certain set of rules or conditions is present. A computer "thinks" logically. It takes information, looks at certain conditions, and then produces a logical output. This processing is called a logical operation.

Duration:

45 minutes

Course Code:

IHRDC_OM_ACPTPL

Objectives:

- Distinguish between a logic diagram and a schematic diagram.
- Describe the operation of Digital Logic gates.
- Construct a truth table and Boolean Expression for Digital Logic gates.
- Determine the output of a circuit that includes several AND gates.
- Determine the output of a circuit that includes NOT, NAND, and AND gates.
- Determine the output of a circuit that includes an OR gate and several other logic gates.
- Determine the output of a circuit that includes a NOR gate and several other logic gates.
- Determine the output of a circuit that includes an EXCLUSIVE OR gate and several other logic gates.
- Determine the output of a circuit that includes an EXCLUSIVE NOR gate and several other logic gates.

Content:

- The AND Gate
- The NOT and NAND Gates
- The OR Gate
- The NOR Gate
- The EXCLUSIVE OR Gate
- The EXCLUSIVE NOR Gate

Maintenance

Introduction to Programming

Description:

The PLCs: Introduction to Programming training program, or unit, is designed to familiarize trainees with the basics of programming a programmable logic controller. After completing this program, the trainees should be able to enter a simple ladder diagram program into the memory of a PLC.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLIP

Objectives:

- Explain how to start programming software and verify proper drivers, connections, and node addresses.
- Name the two main file types in PLC memory.
- Explain how to clear PLC memory.
- Identify PLC bit and word I/O addresses.
- Explain how to use RSLogix to insert a rung into a PLC.
- Identify input and output instructions and explain how to add them to a rung.
- Explain how to use RSLogix to add instructions and branches to a rung in a PLC.
- Differentiate between the instructions for a discrete input device and the instructions for input-type contacts on an output device.
- Differentiate between the instructions for real I/O devices and the instructions for virtual I/O devices.
- Explain how to connect real, discrete I/O devices to a PLC.
- Explain how to determine input and output addresses for PLC screw terminals.
- Explain how to use RSLogix to program a PLC to emulate a hard-wired program.

Content:

- Establishing Communications
  - Programming with a PC
  - The PLC Memory Model
  - Preparing to Program the PLC
- Programming a Rung
  - Basic Rung Using Discrete I/O
  - Complex Rungs
  - Complex Discrete I/O Instructions
- A Real System Example
  - The Hardware
  - The PLC Program

Maintenance

Ladder Logic and Symbology

Description:

The PLCs: Ladder Logic and Symbology training program, or unit, is designed to familiarize trainees with how PLCs use ladder diagrams and what the symbols used on ladder diagrams mean. After completing this program, the trainees should be able to identify common ladder diagram symbols, explain how a ladder diagram rung performs the logic functions necessary to determine whether the rung is true or false, and interpret the meaning of some common PLC instructions.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLLL

Objectives:

- Identify the major parts of a ladder diagram.
- Describe how a ladder diagram forms a parallel circuit.
- Identify the NEMA symbols for common input devices.
- Identify the NEMA symbols for common output devices.
- Differentiate between the Boolean AND, OR and NOT functions for multiple devices on a rung.
- Identify how each rung performs the logic functions necessary to determine whether the rung is true or false.
- Recognize rung numbers on a ladder diagram.
- Interpret cross references on a ladder diagram.
- Explain the PLC mode of operation with the Run-Rem-Prog key switch in each of its positions.
- Identify the typical symbols used in a PLC ladder program and explain the function of mnemonics.
- Identify each of the three parts of the PLC scan cycle.
- Interpret the meaning of some common complex instructions.
- Identify several things that may interrupt the normal scan cycle.

Content:

- The Ladder Diagram Rung
  - The Ladder Diagram as a Parallel Circuit
  - Ladder Diagram Symbols
  - Multiple Devices on a Rung
- Complete Ladder Diagrams
  - The Multiple Rung Control Program
  - Rung Numbers and Cross References
- Ladder Logic Execution
  - PLC vs. Hardwired Program Execution
  - Complex Instructions
  - Interruptions to the Scan Cycle

Maintenance

Program Entry, Testing, and Modification

Description:

The PLCs: Program Entry, Testing, and Modification training program, or unit, is designed to familiarize trainees with the techniques used to install, test, and modify a PLC program, or project. After completing this program, the trainees should be able to explain how to prepare a system for program entry and how to download or enter the program. They should also be able to explain how to test and debug the program and make changes to the program in various processor modes.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLPE

Objectives:

- Explain how to establish communication between a PLC and a PC.
- Explain the steps necessary to clear the memory of a PLC.
- Explain how to install a project in a PLC.
- Explain some common techniques used in test and debug operations.
- Explain what must be done when a PLC's hardware or software configuration is changed.
- Explain how to use the PLC EEPROM for program backup.
- Explain how to use a PC hard drive for program backup.
- Explain the differences between online and offline programming.
- Describe the process for changing the PLC program while the system is in the program mode.
- Describe the process for changing the PLC program while the system is in the run mode.

Content:

- Entering and Testing the Program
  - Preparing for Program Entry; Downloading or Entering a Project; Testing and Debugging
- Configuration and Program Changes
  - Configuration Changes; Uploading and Downloading Projects
  - Changes While in Program Mode; Changes While in Run Mode

Maintenance

Programming Common Functions

Description:

The PLCs: Programming Common Functions training program, or unit, is designed to familiarize trainees with the basics of programming common functions for a programmable logic controller. After completing this program, the trainees should be able to identify common non-I/O PLC instructions and explain how they are used.

Duration:
2 hours

Course Code:
IHRDC_OM_ACLCF

Objectives:

- Differentiate between bit addresses and word addresses.
- Explain the function of each part of a timer.
- Explain the function of each part of a counter.
- Explain how to use word addresses to send data to and from analog I/O modules.
- Explain how program control instructions modify the normal program scan sequence.
- Explain how immediate instructions interrupt the normal program scan cycle.
- Explain how data comparison instructions are used to make program decisions.
- Explain how math instructions are used to perform calculations and modify data.
- Explain how registers and sequencers are used to emulate motor-driven cam switches.
- Explain how file instructions are used to move and manipulate data.
- Explain the operating concept of a PID feedback loop.
- Explain how to connect real, word I/O devices to a PLC.
- Explain how to use RSLogix to program a PLC with some common functions.

Content:

- Simple Word Instructions
  - Word Addresses; Timers; Counters; Analog I/O
- Program Control Instructions
  - Modifying the Scan Sequence; Modifying the Scan Cycle
- Comparison and Math Instructions
  - Data Comparison Instructions; Math Instructions
- Data Manipulation Instructions
  - Registers and Sequencers; File Instructions; PID Loop Instruction
- A Real System Example
  - The Hardware; The PLC Program

Maintenance

Troubleshooting Hardware

Description:

The PLCs: Troubleshooting Hardware training program, or unit, is designed to familiarize trainees with tools and procedures for troubleshooting hardware-related PLC problems. After completing this program, the trainees should be able to explain how to isolate a PLC problem to either hardware or software and network and how to use PLC hardware indicators, programming software, and appropriate test equipment to troubleshoot processor faults and I/O problems.

Duration:

2 hours

Course Code:

IHRDC_OM_ACLTH

Objectives:

- Explain how to isolate a problem to hardware vs. software and network.
- Explain how to identify a software and network problem.
- Explain the meanings of common processor indicators.
- Describe common I/O problems.
- Identify the troubleshooting aids commonly found on a PLC power supply.
- Identify the indicators commonly found on a PLC processor module.
- Identify the indicators commonly found on a PLC I/O module.
- Explain how to go on-line using RSLogix.
- Explain how to use common search functions.
- Explain how to force an input or output instruction.
- Describe how cross references and I/O monitors can be used in troubleshooting.
- Identify the three main parts of a typical I/O system.
- Differentiate between test equipment that is and is not appropriate for troubleshooting PLC systems.
- Use the appropriate programming software and test equipment to troubleshoot a typical input system.
- Use the appropriate programming softw

Content:

- Isolating PLC Problems
  - Isolating the Problem; Software and Network Problems; Hardware Problems
- Hardware Indicators
  - Power Supply; Processor; I/O Modules
- Troubleshooting with Programming Software
  - Starting the Software
  - Using the Search Functions; Using the Force Functions; Using Cross References and I/O Monitors
- Troubleshooting I/O Systems
  - I/O System Organization; Using Test Equipment on I/O Systems
  - Troubleshooting an Input System; Troubleshooting an Output System

Maintenance

Troubleshooting Software and Networks

Description:

The PLCs: Troubleshooting Software and Networks training program, or unit, is designed to familiarize trainees with how to use PLC programming software to isolate software and network problems. After completing this program, the trainees should be able to go on-line to connect to a PLC network and be able to identify and describe the major parts of the PLC memory and some memory protection options. They should be able to explain how to diagnose timer, counter, and sequencer problems and how to use PLC indicators, processor status information, TND and SUS instructions, Custom Data Monitors, and histograms to troubleshoot software problems. They should also be able to explain how to use processor indicators and communications software to isolate network problems, how to isolate network media problems, how to find and fix a network configuration problem, and how to connect to a PLC across a network and then troubleshoot a problem.

Duration:
2 hours

Course Code:
IHRDC_OM_ACLSN

Objectives:

- Explain how to start software and select drivers.
- Explain how to use a browser to connect to a stand-alone or networked PLC.
- Describe the major parts of the PLC memory.
- Describe some major memory protection options.
- Explain how to use the five-step troubleshooting process to troubleshoot a PLC-controlled system.
- Explain how to isolate a problem to software and network vs. hardware.
- Explain how to isolate a problem to software vs. network.
- Explain how the fault indication in the processor status box can be used for troubleshooting.
- Explain how to use processor status table information to isolate problems.
- Explain how to check I/O configuration.
- Explain how to use the TND and SUS instructions to monitor program control instructions.
- Explain how to diagnose timer, counter, and sequencer problems.
- Explain how to use the Custom Data Monitor.
- Explain how to use histograms.
- Explain how to isolate a problem to a specific network node on DH+.<

Content:

- Connecting to the PLC Network
    - Starting the Software; Examining the PLC Memory
- Troubleshooting Software Problems
    - Isolating Problems; Using PLC Status and Configuration Files; Program Control Problems
    - Timer, Counter, and Sequencer Problems; Using Data Monitors
- Troubleshooting Network Problems
    - Isolating the Problem
    - Problems with Network Media; Problems with Network Configuration; Troubleshooting PLCs Across a Network

Maintenance

Applications of VSDs

Description:

The VARIABLE SPEED DRIVES - Applications training program, or unit, is designed to familiarize trainees with common applications of variable speed drives and basic procedures for variable speed drive installation. After completing this program, the trainees should be able to describe ways in which variable speed drives are used and ways in which they are set up and tested.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVDA

Objectives:

- Identify common applications for variable speed drives.
- Describe typical network configurations for drives
- Identify common problems associated with the installation of variable speed drives.
- Set up a variable speed drive for operation.
- Test the operation of a variable speed drive.
- Create checkpointing documentation for a variable speed drive installation.

Content:

- Common Applications
    - Selecting Drives
    - Networking Drives
    - Identifying Problems
- VSD Installation
    - Setting Up
    - Testing the Setup
    - Creating Checkpointing

Maintenance

Introduction to VSDs

Description:

The Introduction to Variable Speed Drives training program, or unit, is designed to familiarize trainees with the operation and use of variable speed drives. After completing this program, the trainees should be able to identify different types of DC and AC drives and explain how they control motor operation.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVSD

Objectives:

- Identify different types of variable speed DC drives.
- Explain the operation of a DC motor controlled by a variable speed controller.
- Identify the major components of a variable speed controller operating a DC motor.
- Explain the operation of a variable speed controller operating a DC motor.
- Identify different types of inverter drives.
- Explain the operation of a AC motor controlled by an inverter.
- Identify the major components of a PWM inverter operating an AC motor.
- Explain the operation of a PWM inverter operating an AC motor.
- Identify the major components of a flux vector drive.
- Explain the operation of an AC motor controlled by a flux vector drive.
- Identify different types of flux vector drives.
- Explain the operation of a flux vector drive.

Content:

- DC Drives
    - Control of DC Motors
    - DC Controller Components
    - DC Controller Operation
- Inverter Drives
    - Inverter Control of AC Motors
    - AC Inverter Components
    - PWM Controller Operation
- Flux Vector Drives
    - Flux Vector Control of AC Motors
    - Flux Vector Controller Operation

Maintenance

Programming Controllers

Description:

The VARIABLE SPEED DRIVES: Programming Controllers training program, or unit, is designed to familiarize trainees with the basic principles of programming controllers for variable speed DC and AC motors. After completing this program, the trainees should be able to identify and describe common parameters that may have to be programmed for a DC variable speed controller and for an AC variable speed controller. They should also be able to describe additional programming that may be required when an AC variable speed controller is set up for flux vector operation.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVPC

Objectives:

- Identify and describe common parameters that may have to be programmed during the setup of a DC variable speed drive controller.
- Identify and describe common parameters that may have to be programmed when configuring the I/O for a DC variable speed drive controller.
- Identify and describe common parameters that may have to be programmed in order to monitor the operation of a DC variable speed drive controller.
- Identify and describe common parameters that may have to be programmed during the setup of an AC variable speed drive controller.
- Identify and describe common parameters that may have to be programmed when configuring the I/O for an AC variable speed drive controller.
- Identify and describe common parameters that may have to be programmed in order to monitor the operation of an AC variable speed drive controller.
- Describe additional programming that may be required when an AC variable speed controller is set up for flux vector operation.

Content:

- Programming DC Controllers
    - Setup
    - I/O Configuration
    - Monitoring
- Programming AC Controllers
    - Setup
    - I/O Configuration
    - Monitoring
    - Flux Vector Programming

Maintenance

System Troubleshooting of VSDs

Description:

The VARIABLE SPEED DRIVES: System Troubleshooting training program, or unit, is designed to familiarize trainees with the use of a basic five-step troubleshooting method to troubleshoot a variable speed drive system. After completing this program, the trainees should be able to describe problems associated with a variable speed drive system's motor, wiring, and electrical supply. They should also be able to describe each step of the five-step troubleshooting process and explain how to use those steps to troubleshoot a problem in a variable speed drive system.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVST

Objectives:

- Explain how to locate and correct loose motor connections.
- Explain how to detect conditions that could lead to motor winding failure, and suggest remedies for those conditions.
- Explain how to detect conditions that could lead to motor bearing failure, and suggest remedies for those conditions.
- Explain how to detect motor leakage currents, and suggest remedies for the problem.
- Explain how to locate and correct loose wiring connections.
- Identify and suggest modifications to variable speed drives affected by improper shielding and grounding.
- Explain how to check and monitor control system feedback.
- Identify and suggest modifications to variable speed drives affected by overvoltage reflections.
- Explain how to locate and correct loose wiring connections.
- Identify and suggest methods for correcting voltage imbalance in variable speed drive systems.
- Explain how to detect single phasing in variable speed drive applications.
- Explain how to detect harmon

Content:

- Troubleshooting a VSD System
    - Troubleshooting the Motor
    - Troubleshooting the Wiring
    - Troubleshooting the Electrical Supply
- Five-Step Troubleshooting Method
    - Know the Equipment
    - Investigate Symptoms
    - List Probable Causes
    - Test Probable Causes
    - Discover Root Causes
    - Troubleshooting Case Study

Maintenance

Systems and Integration of VSDs

Description:

The VARIABLE SPEED DRIVES: System Integration training program, or unit, is designed to familiarize trainees with several common ways in which variable speed drives and automated systems are linked together. After completing this program, the trainees should be able to describe how variable speed drives are integrated into distributed control systems and programmable control systems. They should also be able to describe the operation of tachometers, encoders, and resolvers, and explain how to install field devices for variable speed drives.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVSI

Objectives:

- Describe how variable speed drives are integrated into distributed control systems.
- Identify the network connections between a variable speed drive and a distributed control system.
- Explain how to install a variable speed drive in a distributed control system.
- Describe how variable speed drives are integrated into programmable control systems.
- Identify the network connections between a variable speed drive and a programmable control system.
- Explain how to install a variable speed drive in a programmable control system.
- Describe the operation of a tachometer used to control a variable speed drive.
- Explain how to install and set up tachometers for variable speed drives.
- Describe the operation of an encoder used to control a variable speed drive.
- Explain how to install and set up encoders for variable speed drives.
- Describe the operation of a resolver used to control a variable speed drive.
- Explain how to install and set up resolvers for variable s

Content:

- Control System Integration
  - DCS Integration
  - PLC Integration
- Feedback and Field Device Integration
  - Tachometers
  - Encoders and Resolvers
  - Field Devices

Maintenance

Troubleshooting VSD Controllers

Description:

The VARIABLE SPEED DRIVES: Controllers and Troubleshooting training program, or unit, is designed to familiarize trainees with general procedures for using a variable speed drive controller to troubleshoot system problems and for troubleshooting problems in the controller itself. After completing this program, the trainees should be able to describe how to safely use a variable speed drive controller to locate basic system problems. They should also be able to explain how to use a test point checklist to troubleshoot a variable speed drive controller and how to test the major components of the controller.

Duration:

2 hours

Course Code:

IHRDC_OM_ACVCT

Objectives:

- Describe safe work practices for troubleshooting a variable speed drive.
- Identify and describe the four basic categories of electrical test equipment.
- Explain how to use a controller display to locate operating problems in a variable speed drive.
- Explain how to set up, interpret, and use a key test point checklist to troubleshoot a variable speed drive controller.
- Explain how to check the major components of a variable speed drive controller.

Content:

- Troubleshooting with the Controller
- Safety Basics
- Common Drive Problems
- Troubleshooting the Controller
- Test Point Checking
- Component Checking

IHRDC

International Human Resources Development Corporation

OPERATIONS

Operations & Maintenance e-Learning

For The Oil And Gas Industry

Operations

Basic Principles of Power Plant Operations

Description:

At the completion of this instructional unit, trainees will be able to describe how plant systems respond to changes in load on a unit, and list operator responsibilities during load changes. In addition, trainees will be able to describe the functions of bearings, operation of sliding surface bearings and rolling contact bearings, operator responsibilities associated with bearings, and how bearings are lubricated.

Duration:
2 hours

Course Code:
IHRDC_OM_AOOBP

Objectives:

- **Load Changes**
  - Describe how a plant responds to changes in load on a unit.
  - Describe the basic responsibilities of an operator during a load change.
- **Bearings and Lubrication**
  - Describe two major types of bearings.
  - Describe the basic functions of all bearings.
  - Describe the operation of a typical sliding surface bearing.
  - Describe the operation of rolling contact bearings.
  - Describe some of the basic bearing checks operators perform.
  - Describe how grease is used as a lubricant.
  - Describe how oil is used as a lubricant.

Content:

- Load Changes
  - Plant Responses
  - Operator Responses
- Bearings and Lubrication
  - Bearings
  - Lubrication

Operations

Alkylation Operations

Description:

Some of the products of the catalytic cracking, or cat cracking, unit are the feed stocks for the alkylation, or alky, unit. The gases, or light ends, produced in the cat cracking unit consist partly of olefins. Olefins are valuable because they have a relatively high octane number, but they are also unstable. In addition, the vapor pressure of some of the light end olefins is too high to meet vapor pressure specifications for motor fuel. It is possible to increase the stability and lower the vapor pressure of the olefins while also increasing the octane number. One way to do this is by reacting the olefins with isobutane. The process designed for this reaction is alkylation.

Duration:

45 minutes

Course Code:

IHRDC_OM_ROHFA

Objectives:

- Explain what alkylation is.
- Identify the major chemical reactions that occur during alkylation.
- Identify the main sections of a typical alkylation unit.
- Identify the major process variables that are controlled in an alkylation unit.

Content:

- Introduction to Alkylation Operations
- Feed Preparation
- Reaction Equipment
- Acid Handling
- Fractionation
- Process Variables
- Safety Considerations

Operations

Azeotropic, Extractive, and Vacuum Columns

Description:

This unit discusses three variations of the basic distillation process - the main parts and the general operation of typical azeotropic, extractive, and vacuum distillation systems including process variables to be monitored and controlled.

Duration:

2 hours

Course Code:

IHRDC_OM_RCAEV

Objectives:

- **Introduction**
  - Define the terms conventional distillation, thermal degradation, and azeotrope.
  - Identify three types of distillation processes that may be used instead of conventional distillation.
  - Identify similarities of azeotropic, extractive, vacuum, and conventional columns.
- **Azeotropic columns - Part 1**
  - Describe why azeotropes make conventional distillation impossible.
  - Define the terms minimum boiling point azeotrope and maximum boiling point azeotrope.
  - Identify the major parts of a typical azeotropic distillation system and describe the basic process of azeotropic distillation.
  - Describe the basic process of azeotropic distillation in systems that do not use solvents.
- **Azeotropic columns - Part 2**
  - Identify process variables important to the operation of a typical azeotropic distillation s

Content:

- Introduction
  - Conventional distillation; Conditions unsuited to conventional distillation
  - Three distillation variations; Common distillation column features and operating principles
- Azeotropic columns
  - Azeotropes and their effect on distillation; Azeotropic systems that do not use solvents
  - Azeotropic distillation: Main equipment, solvents, typical process; Distillation solvent recovery
  - Temperature: Azeotropic column and solvent recovery column, Solvent and feed; Solvent to feed ratio
  - Pressures: Azeotropic column, solvent recovery column, Levels Decanter interface
- Extractive columns
  - Extractive distillation and azeotropic distillation
  - Extractive distillation: Main equipment and solvents; typical process; distillation solvent recovery
  - Temperature: Extractive and solvent recovery columns, Feed & solvent; Solvent:Feed Pressures Levels
- Vacuum columns
  - Distilling material at a reduced pressure; Vacuum distillation system: equipment and process
  - Process variables temperature; Pressure Levels and flow rates; Abnormal conditions
  - Changes in feed flow rate or quality; Loss of vacuum

Operations

Blending Operations

Description:

This course explores some common refinery products and the components used to blend them, different methods for blending products, and typical operator responsibilities throughout blending operations.

Duration:
1 hour

Course Code:
IHRDC_OM_ROBLO

Objectives:

- **Introduction to Blending Operations**
  - State the general purpose of blending operations.
  - Identify operational requirements and variables that influence blending operations.
  - Describe the basic concepts of batch blending and in-line blending.
  - Identify common operator responsibilities during blending operations.
- **Gasoline Components and Specifications**
  - Identify common grades of gasoline produced by gasoline blending.
  - Identify typical gasoline blend components provided by process units.
  - Describe specifications and tests for gasoline volatility, vapor/liquid ratio, and octane number.
- **Gasoline Quality**
  - Describe the effect on product quality of blending gasoline blend components with different RON, MON, RVP, and sensitivity values.
  - Define the following terms: oxyge

Content:

- Introduction to Blending Operations: General blending, Batch blending and in-line blending
- Gasoline Components and Specifications
  - Common grades; Gasoline blend components; Gasoline volatility, vapor/liquid ratio, and octane number
- Gasoline Quality
  - Product quality; Oxygenate, octane pool, and blending octane numbers
  - Blending bonuses and blending negatives; Gasoline additives
- Gasoline Blending
  - Octane giveaway, proto fuel, target octane, trimming, and trim component; In-line gasoline blending
- Distillates Blending
  - Common distillates and finished products; Jet fuel ;Diesel fuel; Furnace oil
  - Batch blending distillates to produce diesel fuel
- Asphalt Blending and Residual: Asphalt; Residual fuel; In-line blending of cutback asphalt

Operations

Crude Distillation Operations

Description:

This course provides an overview of the operation of a crude distillation unit. It examines the steps that crude oil goes through in the crude unit, process variables, and conditions that affect unit operation. This course also considers problems that might arise in the crude distillation unit and how to correct them.

Duration:

1 hour

Course Code:

IHRDC_OM_ROCDO

Objectives:

- **Introduction to Crude Distillation**
  - Describe the general purpose of crude distillation.
  - Describe the purposes of the two major steps in crude distillation.
  - Identify equipment typically used in crude distillation.
- **Heating and Desalting**
  - List and describe the basic steps of desalting.
  - Explain how crude is heated both before and after desalting.
  - Describe the operation of a typical desalter.
  - Identify process variables and factors that affect desalter operation.
- **Crude Distillation**
  - Describe the operation of a flash drum and a pre-fractionator.
  - Describe the operation of an atmospheric distillation tower and its associated equipment.
  - Describe the operation of a vacuum distillation tower and its associated equipment.
- **Process Variables**
  - Desc

Content:

- Introduction to Crude Distillation
  - Crude distillation overview; Equipment typically used in crude distillation
- Heating and Desalting
  - Basic steps of desalting; Heating crude before and after desalting; Desalter operation
- Crude Distillation
  - Flash drum and a pre-fractionator; Atmospheric distillation tower; Vacuum distillation tower
- Process Variables
  - Charge heater; Atmospheric tower; Vacuum tower
- Maintaining Process Specifications
  - Cut point, initial boiling point, final boiling point, boiling point percentage, and target temperature range
- Abnormal Conditions
  - Flooding, dry trays, and upset trays

Operations

Fluid Catalytic Cracking Operations

Description:

This course describes the basics of fluid catalytic cracking operations, with emphasis on the equipment that is used, the process variables that are involved, and operator responsibilities.

Duration:
1 hour

Course Code:
IHRDC_OM_ROFCC

Objectives:

- **Introduction to Fluid Catalytic Cracking**
  - Describe the purpose and basic operation of a fluid catalytic cracking unit.
  - Define the following terms: conversion, yield, and catalyst.
  - Identify and describe the functions of the major pieces of equipment in a typical fluid catalytic cracking unit.
  - Explain how the principle of heat balance applies to cat cracker operation.
- **Catalysts and the Cracking Reaction**
  - Explain the role of the catalyst in fluid catalytic cracking operations.
  - Define the terms "selectivity" and "activity" in relation to catalysts.
  - Describe the cracking reaction and explain how it can be controlled.
  - Define the terms "over-cracking" and "severity."
- **Fluid Catalytic Cracking Reactors**
  - Identify and describe the function of risers in a typical fluid catal

Content:

- Introduction to Fluid Catalytic Cracking
  - Unit overview; Conversion, yield, and catalyst; Equipment in a typical unit; Heat balance
- Catalysts and the Cracking Reaction
  - Catalysts in fluid catalytic cracking operations; "Selectivity" and "activity"
  - Cracking reaction; "Over-cracking" and "severity"
- Fluid Catalytic Cracking Reactors
  - Risers in a typical unit; Unit reactor; Recovering spent catalyst
- Catalyst Regeneration
  - Overview of unit regenerator; Flue gas
  - Dense phase, dilute phase, afterburning, and snowballing; Regenerated catalyst samples
- Fractionation
- Catalyst Circulation
  - Controlling catalyst circulation; Improper catalyst circulation
- Process Variables
  - Catalyst-to-oil ratio; Yield, conversion, severity, catalyst-to-oil ratio, and charge rate; Product yields

Operations

Hydrotreating and Catalytic Reforming 1

Description:

Refineries develop and improve products such as high-octane, low-knock gasoline; aviation fuel; and petrochemical feedstocks. The major role of hydrotreating and catalytic reforming units is to work together to produce these fuels and petrochemical feedstocks. This course examines the reactions and equipment that are involved in hydrotreating and catalytic reforming and identifies the process variables that have to be monitored and controlled.

Duration:
1 hour

Course Code:
IHRDC_OM_ROCRO

Objectives:

- **Catalytic Reforming Overview**
  - Explain what hydrotreating and catalytic reforming are.
  - Identify the major sections of typical hydrotreating and catalytic reforming units.
- **Process Reactions**
  - Describe the major chemical reactions that occur during hydrotreating.
  - Describe the major chemical reactions that occur during catalytic reforming.
  - Explain how a reforming catalyst promotes reforming reactions.
  - Explain how recycling hydrogen protects a reforming catalyst.
- **Hydrotreating Equipment**
  - Identify the major components of a typical hydrotreating unit.
  - Describe the functions of the major components of a typical hydrotreating unit.
- **Catalytic Reforming Equipment**
  - Identify the major components of a typical catalytic reforming unit.
  - Describe th

Content:

- Catalytic Reforming Overview
  - Hydrotreating and Catalytic Reforming Fundamentals
- Process Reactions
  - Basic Chemical Reactions
- Hydrotreating Equipment
  - Hydrotreating Unit Parts and Functions
- Catalytic Reforming Equipment
  - Catalytic Reforming Unit Parts and Functions
- Hydrotreating Process Variables
  - Monitoring and Controlling Process Variables
- Catalytic Reforming Process Variables, Part 1
  - Octane Number and Yield; Process Variables in the Reaction Section of Catalytic Reforming
- Catalytic Reforming Process Variables, Part 2
  - Process Variables in the Separation Section of Catalytic Reforming

Operations

Hydrotreating and Catalytic Reforming 2

Description:

Operators who work in hydrotreating and catalytic reforming units should also be knowledgeable in areas such as safety, evacuation and purge procedures, and catalyst regeneration and recognize abnormal operating conditions when they occur and know how to react in order to correct them.

Duration:
1 hour

Course Code:
IHRDC_OM_ROSRO

Objectives:

- **Safety Considerations**
  - Describe some of the dangers of hydrogen.
  - Identify safety hazards related to dangerous gases, hydrocarbons, and chlorides.
  - Describe safety considerations associated with an automatic emergency shutdown of hydrotreating and catalytic reforming operations.
- **Evacuation and Purge**
  - Describe the basic preparations that should be made before a catalytic reforming unit is evacuated and purged.
  - Describe a procedure for evacuating and purging a catalytic reforming unit to prepare it for a maintenance shutdown.
  - Describe a procedure for evacuating and purging a catalytic reforming unit to prepare it for startup.
- **Catalyst Regeneration**
  - Describe the main steps and chemical reactions associated with catalyst regeneration.
  - Describe the basic operating principles for the following types

Content:

- Safety Considerations
  - Dangers of Hydrogen; Safety Hazards of Gases, Hydrocarbons, and Chlorides; Safety Considerations During Emergency Shutdowns
- Evacuation and Purge
  - Preparations for Evacuating and Purgin Catalytic Reforming Unit
- Catalyst Regeneration
  - Chemical Reactions with Catalyst Regeneration; Basic Operating Principles Catalytic Reforming Units
- Abnormal Operating Conditions, Part 1: Identifying and Responding to Hydrotreating Problems
- Abnormal Operating Conditions, Part 2: Identifying and Responding to Catalytic Reforming Unit Problems
- Abnormal Operating Conditions, Part 3: Troubleshooting Catalytic Reforming Unit Problems

Operations

Process Reactor Fundamentals

Description:

Reactors play vital roles in many process plant operations. Basically, a reactor is a piece of equipment that is used to combine or convert raw materials into products by chemical reactions. This course focuses on the fundamentals of reactors used in process plants. Specific areas covered include the basic components of a reactor, reactor operation, types of reactors, auxiliary equipment associated with reactors, and the operator's role in reactor operations.

Duration:
1 hour

Course Code:
IHRDC_OM_RCPRF

Objectives:

- **Reactor Principles**
  - Explain why it is important to charge a reactor correctly.
  - Describe the effects of temperature and pressure on reactor operations.
- **Basic Reactor Design**
  - Describe the basic components of a reactor.
  - Describe auxiliary equipment commonly associated with a reactor.
- **Stirred Tank Reactors**
  - Describe batch and continuous stirred tank reactors.
  - Describe the general operation of a batch stirred tank reactor system.
  - Describe the general operation of a continuous stirred tank reactor system.
- **Tubular Reactors**
  - Identify a tubular reactor.
  - Describe the general operation of a jacketed tubular reactor.
  - Describe the general operation of a fired-tube reactor.
- **Catalytic Bed Reactors**
  - Des

Content:

- Reactor Principles
  - Charging Reactors; Effects of Temperature and Pressure
- Basic Reactor Design
  - Components of a Reactor; Auxiliary Equipment
- Stirred Tank Reactors
  - Batch and Stirred Tank Reactors; General Operations
- Tubular Reactors
  - Tubular Reactors; Jacketed Tubular Reactor; Fired-Tube Reactor
- Catalytic Bed Reactors
  - Fixed-bed Reactor; Fluidized, Moving-bed Reactor
- Reactor Operations
  - Reactor System Operations

Operations

Treating and Sulfur Recovery Operations

Description:

Crude oil contains valuable and desirable hydrocarbon molecules. In addition, however, raw crude and distilled fractions contain impurities. The type and amount of impurities in raw crude and distilled fractions may vary, depending on several factors, including the origins of the crude and the boiling ranges of the fractions. This training unit covers some treating processes that are used to remove or convert sulfur compounds.

Duration:
1 hour

Course Code:
IHRDC_OM_ROTRO

Objectives:

- **Topic I: Introduction to Treating and Sulfur Recovery**
  - State the purpose of treating and sulfur recovery.
  - Identify two types of sulfur compounds contained in crude fractions and explain how they can be removed or converted.
  - Describe a basic caustic wash process.
  - Identify hazards associated with caustic use.
- **Topic II: Amine Treating, Part 1**
  - Identify typical amines used for treating fractions to remove Hydrogen sulfide (H2S).
  - Describe the equipment and operation of a typical amine treatment unit.
- **Topic III: Amine Treating, Part 2**
  - Describe process variables and conditions associated with a typical amine treating process.
  - Explain why foaming is a problem and how it can be minimized.
- **Topic IV: Mercaptan Extraction**
  - Describe the equipment and operation

Content:

- Introduction to Treating and Sulfur Recovery
  - Treating and sulfur recovery; Crude fractions; Caustic use
- Amine Treating, Part 1
  - Typical amines; Amine treatment unit
- Amine Treating, Part 2
  - Typical amine treating process; Foaming
- Mercaptan Extraction
  - Typical mercaptan extraction process
- Mercaptan Conversion
  - Liquid-liquid mercaptan conversion system; Fixed bed mercaptan conversion system
- Sulfur Recovery
  - Claus type sulfur recovery; Sulfur recovery unit operations

Operations

Typical Process Reactions, Part 1

Description:

The purpose of this course is to introduce typical inorganic process reactions such as ionization, oxidation-reduction, and neutralization. You will also learn how those inorganic reactions are used in industry.

Duration:

30 minutes

Course Code:

IHRDC_OM_RCTPR1

Objectives:

- **Overview**
  - Explain process reactions and the difference between organic and inorganic chemistry
- **Inorganic Chemestry**
  - Describe Ionization, Anion and cation
  - Describe how ion exchangers are usedDescribe oxidation-reduction reactions
  - Describe neutralization and how it is used in industry

Content:

- Overview
  - Process Reactions and Differences Between Organic and Inorganic Chemistry
- Inorganic Chemistry
  - Ionization, Anion and Cation
  - Ion Exchangers
  - Oxidation-Reduction Reactions
  - Neutralization

Operations

Typical Process Reactions, Part 2

Description:

The purpose of this course is to introduce organic chemistry and hydrocarbons, as well as about three typical organic process reactions used in industry: alkylation, halogenations, and polymerization

Duration:

30 minutes

Course Code:

IHRDC_OM_RCTPR2

Objectives:

- **Organic Chemistry**
  - Define organic chemistry.
  - Describe Hydrocarbons
  - Describe Bonding properties of carbon.
  - Describe Structural formulas.
- **Chemical Reactions**
  - Describe alkylation and a typical industrial alkylation system.
  - Explain halogenation and the operation of a halogenation system.
  - Explain polymerization and the operation of a polymerization system.

Content:

- Inorganic Process Reactions: Ionization
- Inorganic Process Reactions: Oxidation-reduction
- Inorganic Process Reactions: Neutralization
- Introduction to Organic Chemistry
- Organic Process Reactions: Alkylation
- Organic Process Reactions: Halogenation
- Organic Process Reactions: Polymerization

Operations

Basic Lab Operations

Description:

This unit provides laboratory trainees with basic information about the responsibilities and duties of a lab technician. After completing this unit, the trainees should be able to describe, in general terms, what lab technicians do and how they perform various functions. The unit also covers safety hazards related to lab work and explains how lab technicians are protected from them. In addition, the unit introduces the use of quality control in laboratories and shows how quality control affects lab operations.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTBAL

Objectives:

- **Laboratory Technician Duties**
  - Describe general types of lab analyses.
  - Describe typical lab technician responsibilities.
- **Math and Science Basics**
  - Describe types of mathematical calculations that are commonly performed by lab technicians.
  - Describe scientific principles that can be used to determine physical properties of lab samples.
- **Laboratory Safety**
  - Describe chemical and equipment hazards related to lab work.
  - Describe personal protective gear and emergency equipment that may be used in a lab.
  - Describe the general content of lab emergency plans and procedures.
- **Quality Control in the Laboratory**
  - State the goal of quality control in a laboratory.
  - Describe how quality control affects operations in a laboratory.

Content:

- Laboratory Technician Duties
  - Types of lab analyses; Typical lab technician responsibilities
- Math and Science Basics
  - Calculations, graphs, and control charts; Determining physical properties of samples
- Laboratory Safety
  - Safety hazards; Personal protective gear; Emergency equipment; Emergency plans and procedures
- Quality Control in the Laboratory
  - General quality control concerns; Impact of quality control on lab operations
  - Documentation; Audits

Operations

Laboratory Glassware

Description:

This unit introduces the Trainee to some of the basic methods of handling and using glassware in a laboratory environment. The unit identifies and describes the functions of several commonly used types of laboratory glassware. Also covered are the basic procedures for using glassware such as pipettes and burettes. In addition, general safety procedures related to handling glassware are described, and efficient methods of cleaning and storing glassware are shown.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTGLA

Objectives:

- **Introduction**
  - State some advantages of using glassware in a lab.
  - Describe some general uses of lab glassware.
  - Identify and describe various types of lab glassware.
  - Identify and describe fittings and accessories used with lab glassware.
- **Using Pipettes and Burettes**
  - Describe or demonstrate a basic procedure for using a measuring pipette or a transfer pipette.
  - Describe or demonstrate a basic procedure for using a burette.
- **Safety, Cleaning, and Storage**
  - Describe safety precautions related to handling glassware in the lab.
  - Describe or demonstrate how to clean lab glassware.
  - Describe or demonstrate how store lab glassware.

Content:

- Introduction
  - Advantages of using glassware in a lab
  - Uses of lab glassware; Types of lab glassware; Glassware fittings and accessories
- Using Pipettes and Burettes
  - Using pipettes; Using burettes
- Safety, Cleaning, and Storage
  - Safety; Cleaning lab glassware; Storing lab glassware

Operations

Laboratory Hardware

Description:

This training unit describes some of the equipment typically used in the lab, with emphasis on the safe operation of the equipment. The unit describes lab equipment used for mixing and for grinding. The setup and lighting of a typical gas burner and how to use the burner to heat glassware are covered. Heating equipment that does not require an open flame and safety practices associated with heating materials are discussed. Several types of pumps and their safe operation are described. The parts and operation of a gas cylinder are also covered.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTHAR

Objectives:

- **Mixers and Grinders**
  - Describe lab equipment used for mixing.
  - Describe lab equipment used for grinding.
- **Heating Equipment - Part 1**
  - Explain how to set up and light a gas burner and how to adjust the burner flame.
  - Explain how to heat glassware safely using a gas burner.
- **Heating Equipment - Part 2**
  - Identify and describe the following types of heating equipment: test tube heaters, steam baths, electric mantles, hot plates, muffle furnaces, electric ovens, and constant-temperature baths.
  - Describe some general safety practices associated with heating operations in the lab.
- **Pumps**
  - Identify and describe a positive pressure pump, a tubing pump, vacuum pump, and a water aspirator.
  - Describe checks that are commonly made on lab pumps before and during use.
  - Identi

Content:

- Mixers and Grinders
  - Mixers (Mixer-stirrers, blenders, vortex mixers); Grinders (Motor driven, mortars and pestles)
- Heating Equipment - Part 1
  - Using a gas burner; Heating glassware
- Heating Equipment - Part 2
  - Test tube heaters; Steam baths; Electric mantles
  - Hot plates; Muffle furnace; Electric ovens
  - Constant-temperature baths; Safety practices for heating operations
- Pumps
  - Types of pumps; Inspecting a pump; Troubleshooting pump problems
- Gas Cylinders
  - Parts of a gas cylinder; Preparing a gas cylinder for use; Gas cylinder operation and shutdown

Operations

Laboratory Robotics

Description:

This unit describes the basic design and operation of a typical lab robot. The term robot is defined and the distinction between a robotic system and other types of automation is explained. Lab robot design, with emphasis on how desired movement is achieved, is discussed. An example of a procedure carried out by a robotic system is presented. Technician responsibilities for the preparation and operation of a robotic system are described.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTROB

Objectives:

- **Introduction to Robotics**
  - Define the term robot and explain why robots are used in labs.
  - Describe a typical robotic system.
- **Robot Design**
  - Describe the major parts of a typical lab robot.
  - Describe in general terms how robot movement is controlled.
- **Robotic System Procedure**
  - Identify the components of a robotic system that is used to prepare samples for analyses.
  - Explain how a robotic system can be used to carry out a sample preparation procedure.
- **Technician Responsibilities**
  - Describe lab technician responsibilities commonly associated with the use of a robotic system.
  - Describe some indications of problems with a robotic system.

Content:

- Introduction to Robotics
  - Definition; Uses of robots; Robotic systems
- Robot Design
  - Parts of a robot; Controlling robot movement
- Robotic System Procedure
  - System components; Preliminary steps; Sample preparation; Robots in the lab
- Technician Responsibilities
  - Safety; Types of technician responsibilities

Operations

QA/QC in the Laboratory

Description:

This unit discusses how quality control and quality assurance practices apply to virtually every task that a lab technician performs. It describes the major goals and requirements associated with quality control and quality assurance, and explains how quality control and quality assurance concerns apply to routine lab tasks, to sample handling and testing, and to documentation. It also describes audit requirements for maintaining lab quality control and assurance. (Note: Quality Control and Assurance is appropriate for most industrial labs. For labs that fall under federal regulations 21 CFR 210 and 211, which refer to drug products and bulk pharmaceutical chemicals, Current Good Manufacturing Practices may be the preferred unit of instruction.)

Duration:
45 minutes

Course Code:
IHRDC_OM_LTQCA

Objectives:

- **Introduction**
  - Define the terms quality, quality control, and quality assurance as they apply to lab work.
  - Describe the major goals and requirements associated with quality control and quality assurance.
  - Describe quality control and quality assurance concerns that most directly involve lab technicians.
- **Basic Tasks**
  - Describe quality control and assurance requirements and lab technician responsibilities for standardizing solutions, calibrating lab instruments, and performing routine maintenance and housekeeping tasks in the lab.
- **Samples and Testing**
  - Describe quality control and assurance requirements and lab technician responsibilities for handling and testing samples.
  - Describe quality control and assurance requirements and lab technician responsibilities for interpreting and reviewing test results.
-

Content:

- Introduction
  - What is quality?; Lab quality control; Lab quality assurance
- Basic Tasks
  - Standardizing solutions; Calibrating instruments; Maintenance and housekeeping
- Samples and Testing
  - Receiving and storing samples; Sample testing requirements; Interpreting test results; Reviewing lab work
- Documentation and Audits
  - Uses of documentation; Key documentation requirements; Audits

Operations

Sample Preparation

Description:

In Sample Preparation, trainees are introduced to the ways samples are prepared before they are analyzed in a lab. The unit begins by explaining the importance of sample preparation and of maintaining sample integrity. The unit then focuses on the major tasks associated with sample preparation and describes various common sample preparation procedures.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTSAM

Objectives:

- **Sample Preparation Overview**
  - Explain the difference between representative samples and selective samples.
  - Explain why it is important to maintain sample integrity.
  - Identify and describe the major tasks associated with preparing samples for analysis.
- **Sample Preparation Procedures - Part 1**
  - Describe how crushing and grinding can be performed to prepare a sample for analysis.
  - Explain how crushing and grinding can introduce errors into the analysis of samples.
  - Identify devices that can be used to mix a sample for analysis.
  - Describe why and how a flame test may be performed.
- **Sample Preparation Procedures - Part 2**
  - Explain how samples may be dried.
  - Describe three ways that samples may be filtered.
  - Describe three types of distillation operations that may be used to prepare liquid sample

Content:

- Sample Preparation Overview
  - Representative samples and selective samples; Sample integrity; Sample preparation tasks
- Sample Preparation Procedures - Part 1
  - Crushing and grinding; Errors introduced by crushing and grinding
  - Mixing; Flame testing
- Sample Preparation Procedures - Part 2
  - Drying; Filtration; Distillation; Extraction

Operations

Separation and Isolation of Materials

Description:

Equipment and safe procedures for separating and isolating materials using various methods are covered in this unit. The basic principles and operation of a simple distillation apparatus are discussed, and gravity filtration and vacuum filtration setups and procedures are demonstrated. The unit also explains the basics of extraction and describes extraction equipment and procedures. Finally, the unit explains and describes a crystallization procedure.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTSEI

Objectives:

- **Evaporation and Simple Distillation**
  - Describe how a solvent is evaporated from a solution.
  - Identify the parts and describe the basic operation of a rotary evaporator.
  - Identify the parts of a simple distillation apparatus.
  - Describe how simple distillation can be used to remove a solvent from a solute.
- **Performing Distillation**
  - Describe a setup and procedure for performing a simple distillation.
  - Describe the operation of a fractional distillation setup.
  - Describe differences between vacuum distillation and atmospheric distillation.
- **Filtration**
  - Describe a setup and procedure for performing a gravity filtration.
  - Describe a setup and procedure for performing a vacuum filtration.
- **Liquid Extraction**
  - List the basic requirements for an extraction.

Content:

- Evaporation and Simple Distillation
  - The evaporation process; The distillation process
- Performing Distillation
  - Simple distillation setup; Simple distillation procedure
  - Other types of distillation (Fractional and Vacuum)
- Filtration
  - Gravity filtration; Vacuum filtration
- Liquid Extraction
  - Requirements; Setup and procedure; Breaking emulsions
- Crystallization
  - Setup and procedure; Inducing crystallization

Operations

Weighing and Measuring Techniques

Description:

This unit presents material related to weighing and measuring techniques commonly performed in laboratories. It begins by describing the operation of two types of instruments used to make mass measurements: mechanical and electronic balances. Then the techniques of reading various volumetric measuring devices (including graduated cylinders, pipettes, and burettes) are demonstrated. Next, the unit presents demonstrations of how to make linear measurements using calipers and a measuring microscope. The unit concludes with a segment on temperature measurements that describes the techniques used to read alcohol and mercury thermometers and to check the accuracy of liquid-filled thermometers

Duration:
45 minutes

Course Code:
IHRDC_OM_LTWEM

Objectives:

- **Mass Measurements**
  - Explain the difference between mass and weight.
  - Explain the physical principles behind the operation of a typical mechanical balance.
  - Describe how a typical electronic balance operates.
  - List factors that can affect the accuracy of a mass measurement.
- **Volumetric Measurements**
  - Explain in general how volumetric measuring devices are read.
  - Describe or demonstrate how to use a volumetric flask, a graduated cylinder, a pipette, a burette, and a syringe.
- **Linear Measurements**
  - Explain how calipers can be used to make linear measurements.
  - Explain how a measuring microscope can be used to make linear measurements.
- **Temperature Measurements**
  - Convert temperature readings between the following scales: Fahrenheit, Celsius (centigrade), and Kelvin.<

Content:

- Mass Measurements
  - Weight and mass; Balances; Factors that can affect mass measurements
- Volumetric Measurements
  - Reading volumetric measuring devices
  - Volumetric flasks; Graduated cylinders; Pipettes; Burettes
  - Syringes
- Linear Measurements
  - Calipers; Measuring microscopes
- Temperature Measurements
  - Temperature scales
  - Reading liquid-filled thermometers; Checking the accuracy of a liquid-filled thermometer

Operations

Analytical Procedures

Description:

This unit describes the major tasks associated with performing analytical procedures in a chemical lab. It discusses qualitative and quantitative analyses, accuracy and precision, validation of procedures, and the use of standards. It describes the following basic steps for performing an analysis: handling samples; choosing and performing appropriate analytical procedures; and collecting and reporting data, including calculating percent recovery and relative percent difference.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTANP

Objectives:

- **Analysis**
  - Define the following terms: analyte, qualitative analysis, quantitative analysis, accuracy, precision, validation, primary standard, and secondary standard.
  - Describe the general purpose of an analysis and identify two basic types of analyses.
  - List three major steps for performing a typical analysis.
- **Samples**
  - List factors that can compromise sample integrity.
  - Define the following terms: representative sample, selective sample, and reagent.
  - Identify tasks associated with collecting and receiving samples.
  - Identify tasks associated with preparing and storing samples.
- **Procedures**
  - Describe factors involved in determining whether an analytical procedure is appropriate for a given analysis.
  - Define the following terms: specific procedure, selective procedure, and limit of detection.<

Content:

- Analysis
  - Types of analyses; Major steps of an analysis
  - Accuracy and precision; Validation; Standards
- Samples
  - Sample integrity; Collecting and receiving samples; Sample preparation and storage
- Procedures
  - Choosing an analytical procedure; Carrying out an analytical procedure
- Data
  - Types of data; Collecting data; Calculations
  - Recording and interpreting information; Managing information

Operations

Atomic Absorption

Description:

In this unit, trainees are introduced to atomic absorption analysis. The unit explains the basic principles of atomic absorption and introduces equipment used to conduct atomic absorption measurements for both conventional, or flame, and graphite furnace atomic absorption.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTATA

Objectives:

- **Principles of Atomic Absorption**
  - Define the following terms: atomic absorption, ground state, excited state, percent transmission, percent absorption, absorbance, and characteristic concentration.
  - Describe the process of atomic absorption.
  - Describe how quantitative analysis can be performed by atomic.
- **Atomic Absorption Instrumentation**
  - Describe the components of a typical spectrophotometer.
  - Describe how single-beam light sources and double-beam light sources can be used in atomic absorption.
  - Describe how electronics can be used in atomic absorption.
- **Graphite Furnace Technique**
  - Describe the technique of graphite furnace atomic absorption.
  - Describe equipment that can be used for graphite furnace atomic absorption.
  - Describe the steps involved in a typical graphite furnace atomic absorption an

Content:

- Principles of Atomic Absorption
  - The atomic absorption process; Quantitative analysis by atomic absorption
- Atomic Absorption Instrumentation
  - Spectrophotometers; Double-beam spectrophotometers
  - Electronics in atomic absorption instrumentation
- Graphite Furnace Technique
  - General principles; Components; Sample Analysis

Operations

Gas Chromatography

Description:

This unit explains how sample components can be separated by gas chromatography. It discusses the basic principles of the gas chromatography process and describes the major parts of a typical gas chromatography system, including an autosampler, packed columns, capillary columns, a flame ionization detector (FID), and a data system. It describes the major steps of a chromatographic analysis, including sample preparation and injection, sample separation, component detection, and data processing. It also discusses the basic features of a typical gas chromatogram and describes how the information presented on a gas chromatogram is used for qualitative and quantitative analysis.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTGAS

Objectives:

- **Basic Principles**
  - Define the following terms: chromatograph, chromatogram, mobile phase, carrier gas, stationary phase, gas-liquid chromatography, and gas-solid chromatography.
  - State the three main goals of gas chromatography in most cases.
  - Explain how components are separated and analyzed by gas chromatography.
- **Sample Injection**
  - Describe the function and features of a typical carrier gas supply.
  - Describe one way to prepare a liquid sample for injection.
  - Describe the basic operation of an autosampler.
  - Describe the function and features of a typical injector for a gas chromatograph.
- **Sample Separation**
  - Define the following terms: resolution, HETP, sample capacity, packed column, capillary column, selectivity, retention time, tailing, isothermal operation, and temperature programming.
  - Describ

Content:

- Basic Principles
  - Goals of gas chromatography; A typical gas chromatography system
- Sample Injection
  - Materials and Equipment involved in sample injection
- Sample Separation
  - Columns; The Stationary phase; The oven
- Detection and Data Processing
  - Flame ionization detector; The data system
  - Qualitative and Quantitative information; Abnormal baselines and peak shapes

Operations

High Pressure Liquid Chromatography

Description:

This unit discusses the separation of sample components by the process of high pressure liquid chromatography (HPLC). It explains the basic principles of the HPLC process and describes the major parts of a typical HPLC system, including a solvent pumping system, an autosampler, a column, a variable wavelength UV detector, and a data system. It describes the following major steps for performing an HPLC analysis: solvent preparation and delivery; sample preparation and injection; sample separation; component detection; and data processing. It also discusses how information presented on an HPLC chromatogram may be used for qualitative and quantitative analysis.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTHIP

Objectives:

- **Basic principles**
  - Define the following: gas chromatography, liquid chromatography, solvent, and HPLC.
  - List the three main goals of high pressure liquid chromatography.
  - Identify the major parts of a typical HPLC system and describe the system's basic operation.
  - Identify types of liquid chromatography that may be performed with an HPLC system.
- **Sample injection**
  - Describe equipment and materials involved in the preparation of the sample, the solvent, and the pump for a typical HPLC system.
  - Describe the basic features and operation of a typical autosampler for an HPLC system.
- **Sample separation**
  - Describe the function and features of a typical HPLC column.
  - Describe the function and features of a typical pre-column and a typical guard column.
  - Define the following terms: normal phase liquid chroma

Content:

- Basic principles
  - Types of Chromatography; Other Types of Liquid Chromatography
  - Uses and Goals of HPLC; A typical HPLC System (System overview and System operation)
- Sample injection
  - Sample Characteristics and Preparation; Mobile Phase and Solvent Preparation
  - HPLC Pumps; Sample Injection
- Sample separation
  - HPLC Columns; The Stationary Phase; Loading a Chromatography Column; Component Elution
- Detection and data processing
  - Variable Wavelength UV Detector; Data System

Operations

Infra-Red Analysis

Description:

The purpose of this unit is to present a fundamental treatment of how to perform infrared analysis (IR). The unit starts by describing the basic concepts underlying IR, and then describes several methods used to prepare samples for analysis. After the major components of a typical IR spectrometer are identified, a demonstration of how to perform IR analysis is presented. The unit concludes by introducing the graph used to show the results of an analysis, describing the characteristics of a typical IR spectrum, and identifying different ways IR results can be used in chemical plants.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTINA

Objectives:

- **Basic concepts**
  - Describe how molecules can vibrate.
  - Describe how a sample's molecules interact with infrared radiation.
- **Liquid sample preparation**
  - Describe sample cells that can be used for infrared analyses.
  - Describe considerations associated with selecting solvents for infrared analyses.
  - Describe how to prepare a liquid sample using the thin film method.
  - Describe how to prepare a liquid sample using the ATR method.
- **Solid sample preparation**
  - Describe how to prepare a solid sample using the solution method, the mull method, and the pellet method.
  - Describe general considerations associated with sample preparation.
- **Performing an infrared analysis**
  - Identify two types of spectrometers used to perform infrared analysis.
  - Describe the major

Content:

- Basic concepts
  - Overview; Basic theory
- Liquid sample preparation
  - Sample Cells; Solvents; Liquid Sample Preparation
- Solid sample preparation
  - Types of spectrometers; Spectrometer components
  - Infrared spectrometer operating considerations; Operating an infrared spectrometer
- Infrared analysis results
  - Infrared analysis graph; Spectrum; Analysis

Operations

Ion Concentration Analysis

Description:

This unit introduces trainees to the basic principles associated with ions as well as laboratory procedures that depend on the presence of ions. The unit includes an explanation of how ions are formed and how they can be represented. In addition, the unit describes how a pH meter can be used to measure the acidity or alkalinity of a liquid and how a conductance meter can be used to measure a liquid's ability to conduct current. The unit also includes an explanation of the process of ion exchange chromatography.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTIOC

Objectives:

- **Ion basics**
  - Define the following terms: ion, net charge, cation, monatomic cation, polyatomic cation, anion, monatomic anion, and polyatomic anion.
  - Describe various ways in which different types of ions can be represented.
- **Ion concentration**
  - Define the following terms: acid, base, neutral, and pH.
  - Describe the difference between a strong acid and a weak acid and the difference between a strong base and a weak base.
  - Describe a typical pH meter and explain how it can be used to measure the concentration of hydrogen ions in a sample.
- **Conductivity and ion exchange chromatography**
  - Define the terms: conductance, electrolyte, conductance, chromatography, and ion exchange chromatography.
  - Describe how current can flow through a solution.
  - Explain how conductance measurements can be obtained from a sample in

Content:

- Ion basics
  - What is an ion?; Ion Exchanges; Types of ions
- Ion concentration
  - Acids and Bases; The pH scale; Determining a liquid's pH
- Conductance measurements and ion exchange chromatography
  - Conductance measurements; Ion exchange chromatography

Operations

Mass Spectrometry

Description:

This unit explains the basic principles of mass spectral analysis, identifies the major parts of a typical GC/MS system, and describes the major steps of sample introduction, ionization, fragmentation, separation by mass, detection of ions, and data processing. It describes a typical mass spectrum and a typical total ion chromatogram along with the use of the system for controlling the GC/MS and for data processing, including performing library searches of mass spectra.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTMAS

Objectives:

- **Basic Principles**
  - Define the following terms: spectrum, mass spectrometer, mass spectrum, abundance, relative abundance, and base ion.
  - Describe the basic process of mass spectrometry and explain why it can be used to perform qualitative and quantitative analyses.
  - List the major steps associated with the process of mass spectrometry.
  - Identify the major parts of a typical mass spectrometry system and describe the basic operation of the system.
- **Initial Steps**
  - State the separate purposes of gas chromatography and mass spectrometry in a GC/MS system.
  - List a major advantage and three limitations that relate to sample selection for a GC/MS system.
  - Describe a typical sample introduction step for a GC/MS system.
  - Describe the electron ionization process.
  - Describe how fragmentation occurs in a mass spectrometer.
- **S**

Content:

- Basic Principles
- Initial Steps
  - Gas chromatography/mass spectrometry (GC/MS); Sample introduction; Ionization; Fragmentation
- Separation and Detection: Repeller and focusing optics; Separation; Detection
- Data System Functions
  - Data processing and interpretation; Features: mass spectrum and total ion chromatogram
  - Mass spectrometry system control; Lab technician responsibilities
- Basic concepts
  - How molecules can vibrate; How a sample's molecules interact with infrared radiation
- Liquid sample preparation
  - Sample cells that can be used for infrared analyses; Selecting solvents for infrared analyses
  - Preparing a liquid sample using the thin film method and using the ATR method
- Solid sample preparation:Preparing and general considerations
- Performing an infrared analysis
  - Two types of spectrometers used; Major components of a typical infrared spectrometer
  - Dispersive spectrometers versus FT-IR spectrometers; How to operate a typical infrared spectrometer
- Infrared analysis results: Plotting, representing the response of a sample; Utilization

Operations

Nuclear Magnetic Resonance

Description:

This unit looks at the basis of the NMR phenomenon and the four basic aspects of NMR theory. It examines some of the characteristics of NMR samples and describes two major types of NMR spectrometers along with common lab materials and equipment. It includes a demonstration of sample preparation, equipment setup, and the steps used in a typical procedure, including basic safety issues. After showing the results of an analysis, it describes the characteristics of a typical NMR spectrum and how it relates to NMR theory, showing how integration adds information to NMR results and how it can be used in chemical plants.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTNUM

Objectives:

- **Basic Concepts**
  - Define the following terms: nuclear magnetic resonance, resonance, relaxation, chemical shift, and coupling.
  - Explain how magnetic nuclei respond to an applied magnetic field.
  - Describe how magnetic nuclei achieve resonance and how they achieve relaxation.
- **Samples and Equipment**
  - Explain why solvents, reference compounds, and lock solvents are used when samples are prepared for NMR.
  - Name two major types of NMR spectrometers.
  - Identify and describe major components of a typical NMR spectrometer.
  - Describe the functions of various spectrometer controls.
  - Describe lab equipment and materials typically used for NMR.
- **Performing NMR**
  - Explain how to prepare an NMR sample.
  - Describe how to set up an NMR spectrometer.
  - Describe how to operate an NMR spectrometer.

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Content:

- Basic Concepts
- Samples and Equipment: Types of spectrometers; Spectrometer components; Lab materials and equipment
- Performing NMR
  - Overview of sample processing; Sample preparation; Equipment setup; Equipment operation; Safety
- Using NMR Results: MR graphs; Typical NMR spectrum; Integration

Operations

Optical Analysis

Description:

In this unit, the basic Principles and operation of optical analytical instruments are discussed. This unit looks at the basic principles, operation, and use of colorimeters, polarimeters, turbidimeters, nephelometers, and refractometers.

Duration:

45 minutes

Course Code:

IHRDC_OM_LTOPA

Objectives:

- **Principles of Optical Analysis**
  - Define the following terms: electromagnetic radiation, electromagnetic spectrum, frequency, and wavelength
  - Describe in general terms the relationship between electromagnetic radiation and optical analysis
- **Colorimeters**
  - Identify the parts of a colorimeter
  - Explain how a colorimeter is used to analyze a sample
  - Explain how a calibration curve is obtained
- **Polarimeters**
  - Describe the basic principles of polarimetry
  - Identify the parts of a simple polarimeter
  - Explain how to set up and use a simple polarimeter
  - Describe a general procedure for performing an analysis using an automatic polarimeter
- **Turbidimeters and Nephelometers**
  - Describe the basic principles of turbidimetry and neph

Content:

- Principles of Optical Analysis
  - Electromagnetic radiation; The electromagnetic spectrum
- Colorimeters
  - Parts of a colorimeter; Setting up a colorimeter
  - Analyzing a sample; Calibration curve
- Polarimeters
  - Basic principles of polarimetry; Basic parts of a polarimeter; Setting up a polarimeter
  - Analyzing a sample; Using an automatic polarimeter
- Turbidimeters and Nephelometers
  - Basic principles of turbidimetry and nephelometry; Parts and operation of a turbidimeter; Using a turbidimeter
- Refractometers
  - Principles of refractometry; Using a refractometer

Operations

UV Visible Spectroscopy

Description:

This unit is designed to introduce trainees to the analytical technique of UV-Visible spectroscopy. The unit covers the properties of the electromagnetic spectrum and the basic principles of UV-Visible spectroscopy as well as terms used to describe this analytical technique. The unit also introduces the equipment used to perform UV-Visible spectroscopy and covers the way typical UV-Visible spectroscopy analysis can be performed.

Duration:
45 minutes

Course Code:
IHRDC_OM_LTUVV

Objectives:

- **Principles of UV-Visible Spectroscopy**
  - Describe the properties of the electromagnetic spectrum.
  - Define the following terms: spectroscopy, amplitude, wavelength, frequency, percent transmission, absorbance, spectral absorbance curve, and band pass.
  - Describe the process of UV-visible spectroscopy.
  - Describe how quantitative and qualitative analyses can be performed using UV-visible spectroscopy.
- **Samples and Equipment**
  - Describe the components of a UV-visible spectrophotometer.
  - Define the term chromophore.
  - Describe considerations associated with samples used in UV-visible spectroscopy.
- **Performing UV-Visible Spectroscopy**
  - Describe general considerations associated with using UV-visible spectroscopy for a quantitative analysis.
  - Describe how to use a spectrophotometer to perform a quantitative ana

Content:

- Principles of UV-Visible Spectroscopy
  - Electromagnetic energy and the electromagnetic spectrum
  - The UV-visible spectroscopy process; UV-visible spectroscopy analyses
- Samples and Equipment
  - Spectrophotometer components; UV-visible spectroscopy samples
- Performing UV-Visible Spectroscopy
  - Test considerations; Preparations
  - Analyzing standard solutions; Testing a sample

Operations

Basic Principles of Pressure and Temperature

Description:

Introduces the concepts of pressure and temperature. Explains temperature scales and measurement techniques. Illustrates effects of pressure and temperature changes in liquids and gases, and defines vapor pressure, surface tension, evaporation, condensation and compressibility.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP110

Content:

- Force and Pressure
  - Matter
  - Energy
  - Force
  - Pressure
- Heat and Temperature
  - Sources of Heat
  - Transfer of Heat
  - Temperature
  - Temperature Scales
  - Temperature Measurement
- Pressure and Temperature in Liquids and Gases
  - Pressure at Various Depths
  - Vapor Pressure
  - Surface Tension
  - Evaporation
  - Condensation
  - Expansion and Contraction of Gases
  - Transfer of Heat in Gases

Operations

Heat Exchanger Principles

Description:

Introduces the concept of heat transfer between fluids. Describes and explains basic heat transfer equipment (coolers, heaters, condensers, vaporizers, etc.) and primary exchanger configurations (double pipe, plate, shell and tube, aerial). Illustrates internal functions and field applications.

Duration:

45 minutes

Course Code:

IHRDC_VLO_OP960

Content:

- Introduction to Heat Exchanger Principles
  - Heat Transfer
  - Factors Affecting Heat Transfer
  - Functions of Heat Transfer Equipment
  - Types of Heat Exchangers
- Heat Exchanger Operation
  - Flow Path
  - Tube Arrangement
  - Double Pipe
  - Plate
  - Shell and Tube
  - Aerial Coolers

Operations

Gas Processing Utilities and Systems (task focused)

Description:

Describes the purpose and function of critical gas processing utilities, including the heat medium system, heat tracing system, power generation, instrument air system, flare and incinerator systems, and uninterruptible power supplies. Identifies key operating considerations, as well as corrective actions for temperature and pressure upsets.

Duration:

1 hour

Course Code:

IHRDC_SMT_GPUT006

Content:

- Introduction to Heat Medium Heaters
- Introduction to Air Compressors
- Resetting a Breaker
- Load Shedding
- Identifying Critical Operational Procedures

Operations

Inlets System (task focused)

Description:

Describes the main components of the inlet area and summarizes the process for managing pipeline pressure. Outlines pigging operations and hazards. Describes the purpose and function of slug catchers, inlet separators, and pressure and level control systems. Explains the function of restriction orifices and flowmeters.

Duration:

1 hour

Course Code:

IHRDC_SMT_GPIN011

Content:

- Introduction to Inlets
- Introduction to Pigging
- Introduction to Slug Fingers
- Introduction to Inlet Separators
- Controlling the Inlet Area
- Troubleshooting the Inlet Area

Operations

Liquids Product Storage (task focused)

Description:

Covers the characteristics and storage of produced water, condensate, and natural gas liquids and the associated hazards. Also describes the grounding of a tank truck.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPPS012

Content:

- Introduction to Condensate Storage
- Introduction to Produced Water Storage
- Introduction to Ngl Storage Bullets
- Introduction to Truck Loading

Operations

Principles of Gas Processing

Description:

Introduces gas processing. Outlines common contaminants, methods of contaminant removal, and methods of removal of natural gas liquids. Includes discussion of fractionation.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP610

Content:

- Overview/Contaminant Removal
  - Metering
  - Gas Gathering
  - Separation
  - Contaminants
  - Removal of Water
  - Removal of Hydrogen Sulfide
  - Removal of Non-Combustible Inert Gases
- Ngl Separation
  - Cryogenics
  - Refrigeration
  - Lean Oil Absorption
  - Fractionation

Operations

Gas Processing Systems (task focused)

Description:

Provides a general overview of gas processing, including critical process variables, hydrate formation, P&ID and PFD diagrams, wellhead components, safety controls, pressure regulators, alarms and shutdowns, and water distribution related to fracturing operations.

Duration:

1 hour

Course Code:

IHRDC_SMT_GPGE005

Content:

- Define Natural Gas
- Extracting Natural Gas
- Introduction to Gas Gathering
- Introduction to a Gas Processing Facility

Operations

Gas Recovery Systems (task focused)

Description:

Provides an overview of a gas recovery system and the flow of gas through the system components. Details the functions of the inlet scrubber, compressor, and aerial cooler, and how pressure is maintained in the system.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPGR008

Content:

- Introduction to Gas Recovery
- Identifying the Equipment
- Operating the Equipment

Operations

Refrigeration Systems (task focused)

Description:

Provides an overview of a refrigeration system and the purpose and function of its main components, including the refrigerant compressor, suction scrubber, oil system, condenser and refrigerant accumulator, and the filter/dryer. Defines non-condensables and how accumulation causes problems in the system. Describes vaporization and vapor lock.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPRE013

Content:

- Introduction to the Refrigeration System
- Identifying the Equipment
- Operating the Refrigeration System
- Introduction to Non-Condensables

Operations

Production Separator Principles

Description:

Presents the typical production separator. Illustrates the internal operation of vertical, horizontal, spherical, and multiphase separators. Describes liquid level controls and safety devices.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP410

Content:

- Introduction
  - Fluid Separation Principles
  - Typical Production Separator
  - Separator Components
  - Separator Flow
- Types of Separators
  - Overview
  - Two-Phase Vertical
  - Two-Phase Horizontal
  - Two-Tube Horizontal
  - Spherical
  - Three-Phase Vertical
  - Other Three-Phase Methods
- Instrumentation and Safety Devices
  - Liquid-Level Controller
  - Gas Pressure Controls
  - Safety Devices

Operations

Condensate Stabilization (task focused)

Description:

Describes the role of a condensate stabilization system in handling natural gas liquids for storage and transport and increasing their recoverable quantities. Traces the flow of gas through the system and provides details about its main components, including the feed bottoms exchanger, stabilizer column, stabilizer reboiler, and condensate cooler. Discusses the importance of temperature and pressure control.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPCS003

Content:

- Introduction to Condensate
- Identifying the Equipment
- Controlling the Process

Operations

Reciprocating Compressor Principles

Description:
Describes the principles of reciprocating compressors, detailing the parts and operation of the the compression unit and the drive unit.

Duration:
1 hour

Course Code:
IHRDC_VLO_OP650

Content:

- Introduction to Reciprocating Compressor Principles
  - Gas Compression
  - Typical Compressors
  - Piston Operation
  - Typical Reciprocating Compressor
  - Compression Unit Components
  - Compressor Operation
  - Valves
- The Compression Unit
  - Air Cooling
  - Water Cooling
  - The Cylinder
  - Compression Unit Lubrication
  - Wiper or Scraper Rings
  - Clearance Pocket
  - Unloaders
- The Drive Unit
  - Crank Assembly
  - Crosshead
  - Connecting Rod
  - Power Source
  - Balanced-Opposed Unit
  - Integral Unit
  - Multi-Stage Unit

Operations

Reciprocating Compressor Operation

Description:

Covers the major components and auxiliary systems of a reciprocating compressor package, the normal operation of the reciprocating compressor package and common troubleshooting techniques used with reciprocating compressor packages.

Duration:

2.5 hours

Course Code:

IHRDC_VLO_OP651

Content:

- Compressor Package
  - Compressor
  - Prime Mover
- Compressors and Auxiliary Systems
  - Compressor Types
  - Compressor Design
  - Compressor Gas Flow
  - Cooling Systems
  - Lubrication Systems
  - Safety and Control Systems
- Normal Operation
  - Compressor Key Indicators
  - Prime Mover Key Indicators
  - Other Operational Checks
  - Daily Inspections
  - Periodic Inspections
- Startup and Shutdown
  - Compressor Startup
  - Compressor Shutdown
- Troubleshooting
  - Compressor
  - Compressor and/or Prime Mover
  - Prime Mover

Operations

Centrifugal Compressor Principles

Description:
Describes the principles of centrifugal compressors, detailing the parts and operation of the compression unit and the drive unit.

Duration:
1.5 hour

Course Code:
IHRDC_VLO_OP660

Content:

- Introduction to Centrifugal Compressor Principles
  - Typical Centrifugal Compressor
  - Centrifugal Compressor Operation
  - Multi-Stage Compressors
  - Axial Compressors
- The Compressor
  - Casings
  - Rotors
  - Guide Vanes
  - Diffuser and Volute
  - Diaphragms
  - Shaft Seals
  - Shaft Bearings
  - Lubrication System
  - Seal Oil System
  - Cooling System
- Drivers, Couplings, and Controls
  - Drivers
  - Direct Drive
  - Gear Drive
  - Couplings
  - Compressor Performance
  - Surge Control
  - Safety Devices
- Classification

Operations

Compression Overview (task focused)

Description:

Introduces the principles of gas compression. Compares single-stage and multi-stage compressors. Details the purpose, function and important operating considerations of key components such as the cylinder lubricating system, suction scrubber, coolers, and dampener, as well as the control of pressure and temperature.

Duration:

1 hour

Course Code:

IHRDC_SMT_GPCO002

Content:

- Introduction to Compressors
- Operating the Compressors
- Controlling the Compressors

Operations

Feed Gas Chilling (task focused)

Description:

Outlines the role of a feed gas chilling system and traces the flow of gas through the system components. Details the functions of the lube oil coalescer/filter, gas/gas heat exchanger, gas chiller, and low temperature separator. Describes glycol injection and identifies common problems and corrective actions. Discusses the importance of differential pressure in the system.

Duration:

45 minutes

Course Code:

IHRDC_SMT_GPFG007

Content:

- Introduction to Gas Processing
- Define Dew Point
- Identifying the Equipment
- Operating the Equipment

Operations

Amine System Overview (task focused)

Description:

Describes the use of amine systems for acid gas removal. Illustrates the process flow of a typical amine unit and the effects of temperature and pressure on the process. Explains the purpose, function, and key operating considerations of each main system component, including the contactor column, flash tank, filters, coolers, regenerator, reboiler, and pumps. Discusses H2S analysis and corrective actions.

Duration:

1 hour

Course Code:

IHRDC_SMT_GPAS001

Content:

- Define Sour Gas
- Introduction to Amine Systems
- Identifying the Equipment
- Operating the System
- Introduction to Liquid Foaming

Operations

Principles of Amine Sweetening

Description:

Describes the problems caused by acid gases in natural gas and the chemical processes used to remove them. Outlines the process flow of a typical amine sweetening unit and highlights the function of its components. Illustrates the internal workings of the closed vessels (contractor column, flash tank, heat exchanger, stripper column and reboiler).

Duration:

1 hour

Course Code:

IHRDC_VLO_OP640

Content:

- Overview of Principles of Amine Sweetening
  - Acid Gases in Natural Gas
  - Gas Sweetening
  - Alkanolamines
  - Absorption
  - Distillation
  - Heat Transfer
  - Basic Process
- Process Flow and Components
  - Inlet Separator
  - Contactor Column
  - Flash Tank
  - Filters
  - Lean/Rich Heat Exchanger
  - Stripper Column
  - Reflux Condenser/Accumulator
  - Reboiler
  - Reclaimer
  - Surge Tank
  - Trim Cooler

Operations

Amine Sweetening Unit Operation

Description:

Describes types of amine, the amine sweetening process and process variables. Details sweetening unit controls and operation. Discusses amine conditioning and reduction of amine losses.

Duration:

1.5 hour

Course Code:

IHRDC_VLO_OP641

Content:

- Introduction to Amine Sweetening Unit Operation
  - Types of Alkanolamines
  - Alkanolamine Sweetening
  - Water Quality
  - Sweetening Process
  - Process Variables
- Operation and Controls
  - Inlet Separator
  - Contactor Column
  - Outlet Separator
  - Flash Tank
  - Filters
  - Lean/Rich Heat Exchanger
  - Stripper Column
  - Reflux System
  - Reboiler
  - Reclaimer
  - Heat Medium
  - Surge Tank
  - Circulation Pumps
  - Trim Cooler
- Amine Conditioning and Reducing Amine Losses
  - Temperature and Pressure Conditions
  - Reducing Amine Losses
  - Amine Tests

Operations

Blinding

Description:

Describes blinding principles, including types of blinds as well as equipment commonly mistaken for blinds. Describes preparations and procedures for installing and removing blinds.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP240

Content:

- Blinds
  - Function of Blinds
  - Conditions That Require Blinding-
  - Types of Flanges
  - Types of Blinds
  - Equipment Mistaken For Blinds
- Blinding Preparation
  - Selection Criteria
  - Gasket Selection Criteria
  - Pressure Rating
  - Locations
  - Blind Service
  - Equipment Needed For Blind Installation
- Blind Installation and Removal
  - Job Planning
  - Blind List
  - Site Preparation
  - Installation
  - Tagging and Flagging
  - Removal
  - Alternatives to Blinding

Operations

Principles of Glycol Dehydration

Description:

Outlines the equipment and processes involved in glycol dehydration of natural gas streams. Describes all component of the typical dehydration system and how they work together in removing water from natural gas.

Duration:

45 minutes

Course Code:

IHRDC_VLO_OP620

Content:

- Glycol Dehydration
  - Glycol Dehydration Basics
  - Glycol Recylcing
- Glycol Dehydration Process Flow and Components
  - System Overview
  - Natural Gas Flow
  - Contactor Column Glycol Flow
  - Initial Glycol Recycling
  - Final Glycol Recycling

Operations

Glycol Dehydration Unit Operation

Description:

Details the operation of the unit and its control instrumentation. Explains procedures and tests for maintaining the liquid glycol and reducing losses. Includes checklists for troubleshooting, startup and shutdown.

Duration:

1.5 hour

Course Code:

IHRDC_VLO_OP621

Content:

- Introduction to Glycol Dehydration Unit Operation
  - Liquid Desiccants
  - Glycol Dehydration Process
  - Dew Point
  - Process Variables
- Operation and Controls
  - Inlet Separator
  - Contactor Column
  - Gas-Condensate-Glycol Separator
  - Filters
  - Regenerator
  - Surge Tank
  - Pumps
  - Heat Exchangers
- Glycol Conditioning and Reducing Glycol Losses
  - Temperature and Pressure Conditions
  - Reducing Glycol Losses
  - Glycol Tests

Operations

Glycol Dehydration Systems Overview (task focused)

Description:

Describes the purpose and function of a glycol dehydration unit and its main components, including the inlet filter/separator, glycol contactor, and gas/glycol exchanger. Discusses level control, as well as the effects of temperature and pressure.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPGD009

Content:

- Introduction to the Glycol Dehydration System
- Identifying the Equipment
- Operating the Equipment
- Controlling the Process

Operations

Glycol Regeneration System Overview (task focused)

Description:

Describes the purpose of a glycol regeneration system, and the functions of its main components, including the flash tank, filters, regenerator, accumulator, and condensing tank. Summarizes the regular routine maintenance of the glycol system, as well as adjusting pump packing.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPGR010

Content:

- Introduction to the Glycol System
- Identifying the Equipment
- Introduction to Glycol Filters
- Operating the Glycol Pumps
- Controlling the Glycol System

Operations

Cryogenic Process Principles

Description:

Presents the concepts and principles of cryogenics as used in gas processing. Includes the components of a typical cryogenic plant. Describes flow of the process gas and liquid streams.

Duration:

1.5 hour

Course Code:

IHRDC_VLO_OP670

Content:

- Introduction to Cryogenic Process Principles
  - Natural Gas Components
  - Economics of Liquid Separation
  - Gas Chilling
  - Cryogenic Process
- Expander-Compressor Plant
  - Components and Flow
  - Inlet Filter-Separator
  - Molecular Sieve Beds
  - Dust Filters
  - Heat Exchangers
  - Cold Separator
  - Expander-Compressor
  - J-T Valve
  - Demethanizer
  - Additional Equipment
  - Vessels and Piping
- Process Flow
  - Process Gas Stream
  - Process Liquid Stream
  - Plant Variations

Operations

Deethanization (task focused)

Description:

Summarizes the purpose and operating principles of a de-ethanizer distillation tower. Describes pressure control logic and temperature control logic. Outlines the corrective actions for out-of-range temperature and liquid level.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPDE004

Content:

- Introduction to De-Ethanization
- Operating a De-Ethanizer Tower
- Controlling the Process

Operations

Orifice Meter Station Fundamentals

Description:

Emphasizes the importance of accurate gas volume measurement. Outlines the principles of gas flow and the basic elements of the orifice meter station. Demonstrates correct procedure for changing an orifice meter chart. Presents examples of field gas volume calculations.

Duration:

1.5 hour

Course Code:

IHRDC_VLO_OP510

Content:

- The Orifice Meter Station
  - Gas Flow Principles
  - Meter Station Components
  - The Primary Element
  - Associated Components
  - The Secondary Element
  - Orifice Meters
- The Orifice Meter Chart
  - Chart Design
  - Chart Variables and Inking
  - Chart Processing
  - Chart Scanning Problems
- Chart Changing Techniques
  - Visual Inspection
  - Removing and Installing Charts
  - Chart Handling Techniques
- Field Gas Volume Calculations
  - Reading Charts
  - Calculating Flow Rate

Operations

Orifice Meter Station Operations/Maintenance

Description:

Details the differences between pipe taps and flange taps. Describes the operation and maintenance of the orifice plate, orifice fitting, orifice meter recorder, manifold and associated piping.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP520

Content:

- The Primary Element
  - Gas Flow Principles
  - Pressure Drop
  - Meter Tube
  - Orifice Plates
  - Orifice Fittings
  - Pressure Taps
- The Secondary Element
  - Meter Piping and Manifold
  - Orifice Meter Recorders
  - Mercury Meter Recorder
  - Bellows Meter Recorder
  - Static Pressure Recorder
  - Flow Computers

Operations

NGL Measurement I: Gas Liquids and Metering

Description:

Describes natural gas liquids and the principal elements of a metering station. Introduces and compares volume and mass measurement and sampling techniques. Discusses the importance of solids removal, single phase flow, pulsation dampening and turbulence reduction.

Duration:
1 hour

Course Code:
IHRDC_VLO_OP530

Content:

- Natural Gas Liquids
  - Natural Gas Components
  - Gas Composition: ""Dry"" Gas Vs ""Wet"" Gas
  - Measurement Importance
  - Flow Principles
  - Laminar and Turbulent Flow
- Meter Stations
  - Meter Stations
  - Primary Elements
  - Types of Metering Devices
  - Secondary Elements
  - Tertiary Elements
  - Associated Components
- Measurement Overview
  - Volume Measurement
  - Mass Measurement
- Ngl Sampling and Measurement
  - Component Measurement
  - Factors Affecting Measurement

Operations

NGL Measurement II: Methods for Measurement

Description:

Describes the basic methods for measurement: orifice meters, turbine meters, positive displacement meters and density meters. Demonstrates the procedure for witnessing an orifice meter test in the field. Illustrates meter proving and calibration.

Duration:

1 hour

Course Code:

IHRDC_VLO_OP540

Content:

- Ngl Measurement Meters
  - Differential Pressure Meters
  - Primary Elements
  - Turbine Meters
  - Ultrasonic Meters
  - Positive Displacement Meters
  - Coriolis Meters
  - Ngl Custody Transfer Measurement
- Meter Witnessing and Proving
  - Meter Witnessing and Proving
  - Meter Calibration
  - Inspection of Mechanical Meters
  - Densitometer Proving
  - Densitometer Calibration

Operations

Natural Gas and NGL Sampling

Description:

Introduces equipment and procedures involved in gas and NGL sampling. Illustrates sample cylinders, sampling points, sampling methods, and safety considerations at field locations. Emphasizes the importance of correct sampling techniques and safety precautions.

Duration:
1 hour

Course Code:
IHRDC_VLO_OP550

Content:

- Sampling Fundamentals
  - Importance of Sampling
  - Sample Analysis
  - Sample Cylinders
  - Sample Probe
  - Sample Point Location
  - Pressure Effects
  - Types of Samples
- Natural Gas Sampling
  - Equipment
  - Sample Identification
  - Sampling Methods
  - Ngl Sampling
  - Equipment
  - Sample Identification
  - Sampling Methods

Operations

Electronic Flow Measurement

Description:

Introduces the components and basic operating principles of Electronic Flow Computers, discusses their benefits and limitations, and describes fundamentals of data entry and collection.

Duration:

1.5 hour

Course Code:

IHRDC_VLO_OP560

Content:

- Electronic Flow Measurement Fundamentals
  - Orifice Meter Stations
  - Electronic Flow Computer Components
  - Monitor and Control
  - Benefits of Electronic Flow Computers
- Data Handling
  - Data Input
  - Data Collection
  - Data Collection Equipment
  - Central Control Station Unit
  - Witnessing
  - Limitations of Electronic Flow Computers

Operations

Gas Metering and Custody Transfer (task focused)

Description:

Provides an overview of the sales gas section of a processing facility. Describes metering stations, custody transfer point, and the importance of pressure control of the gas entering the sales pipeline. Describes sales gas specifications and the importance of quality control and quality assurance. Identifies causes of sales gas line shutdown.

Duration:

30 minutes

Course Code:

IHRDC_SMT_GPSG014

Content:

- Introduction to Sales Gas
- Metering and Custody Transfer
- Sales Gas Specifications and Quality
- Sales Gas Line Shutdown

Operations

Basic Lifting

Description:

This interactive training unit is designed to familiarize trainees with the proper use of devices designed to lift and move loads. After completing this unit, trainees should be able to describe how to use a simple block and tackle, a compound block and tackle, a hoist, a jack, a winch, a turnbuckle, and a load leveler. They should also be able to describe the effects of sling angles and hitch patterns on a sling's lifting ability.

Duration:

2 hours

Course Code:

IHRDC_OM_AMRLL

Objectives:

- **Block and Tackle**
  - Identify the parts of a simple block and tackle.
  - Describe the proper use of a simple block and tackle.
  - Identify the parts of a typical compound block and tackle.
  - Describe inspections that are typically performed before a compound block and tackle is used.
  - Explain what is involved in reeving a block and tackle.
  - Describe the proper use of a compound block and tackle.
  - Define *mechanical advantage*.
  - Explain how to use a formula to select the appropriate block and tackle needed to lift a given weight.
- **Hoists, Jacks, and Winches**
  - Describe the basic operation of a chain hoist.
  - Describe the basic operation of a come-along.
  - Describe the basic operation of a ratchet jack.
  - Describe the basic operation of a screw jack.
  - Describe the basic operation of a hydraulic jack.
  - Describe basic safety precautions associated with using

Content:

- Block and Tackle
  - Simple Block and Tackle
  - Compound Block and Tackle
  - Mechanical Advantage
- Hoists, Jacks and Winches
  - Hoists
  - Jacks
  - Winches
- Slings and Levelers
  - Slings
  - Leveling Devices

Operations

Heavy Lifting

Description:

This interactive training unit is designed to familiarize trainees with equipment and procedures used for lifting and moving heavy objects. After completing this unit, trainees should be able to describe various types of rigging hardware and cranes. They should also be able to explain how to use lifting capacity charts and how to balance loads.

Duration:

2 hours

Course Code:

IHRDC_OM_AMRHL

Objectives:

- **Heavy Lifting Equipment**
  - Describe the following rigging components and identify basic inspection checks that should be made to them:
    - Shackles
    - Hooks
    - Swivels
    - Turnbuckles
    - Rigging links and equalizer plates
    - Lifting lugs and eyebolts
    - Spreader beams and lifting beams
    - Tag lines
- **Heavy Lifting Procedures**
  - Describe how to read and interpret lifting capacity charts.
  - Describe load balancing techniques commonly used during heavy lifting.
  - Describe basic procedures involved in planning and completing a heavy lifting job using a crawler crane.

Content:

- Heavy Lifting Equipment
  - Hardware
  - Bridge Cranes
  - Boom Cranes
  - Crane Inspections
- Heavy Lifting Procedures
  - Capacity Charts
  - Load Balancing
  - Crawler Crane Job

Operations

Overview of Rigging

Description:

This interactive training unit is designed to familiarize trainees with the basic principles involved in moving materials and equipment from one place to another. After completing this unit, trainees should be able to describe the functions of various types of rigging equipment and explain how to select and inspect equipment for a job that involves rigging.

Duration:

2 hours

Course Code:

IHRDC_OM_AMROV

Objectives:

- **Introduction to Rigging**
  - Describe the basic characteristics of fiber rope, wire rope, and chain.
  - Identify and describe the functions of the following end fittings and connectors: eye splices, thimbles, wire rope clips, shackles, sockets, wedge sockets and hooks.
  - Identify and describe the uses bridle slings, choker hitch slings and basket hitch slings.
  - Explain how to inspect wire rope, chains, synthetic web slings, hooks, shackles and sockets, and equipment to be rigged.
- **Derricks and Cranes**
  - Identify the following types of derricks:
    - A-frame and Gin pole derricks
    - Guy derricks and Stiffleg derricks
    - Chicago boom derricks
  - Identify the following types of cranes:
    - Crawler cranes
    - Truck-mounted cranes
    - Truck-mounted hydraulic cranes
    - Gantry-mounted cranes
    - Tower-mounted cranes
    - Hammerhead cranes

Content:

- Introduction to Rigging
  - Ropes and Chains
  - End Fittings, Connectors, and Slings
  - Equipment Inspections
- Derricks and Cranes
  - Derricks and Cranes
  - Crane Hand Signals
- Rigging and Moving Loads
  - Estimating Size, Weight, and Center of Gravity
  - Tying Knots
  - Rigging and Moving Materials and Equipment

Operations

Abnormal Conditions and Emergencies

Description:

This is an interactive training module designed to familiarize trainees with some abnormal operating conditions that a boiler operator may encounter on the job. Specific attention is directed to typical procedures used by plants to handle these situations and to the methods and means available to the operator to anticipate problems and to minimize the chances of their occurring.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBAC

Objectives:

- **Common Problems**
  - Describe typical procedures for dealing with the loss of certain boiler auxiliaries.
  - Describe basic procedures for dealing with leaks that occur inside and outside a boiler.
  - Describe how safety valves are used to protect boilers against overpressure.
  - Describe what boiler operators should do to deal with leaking safety valves.
  - Describe basic procedures for dealing with fires in coal yards, bunkers, feeders, pulverizers, and air preheaters.
  - Explain how equipment fires start and identify actions that operators should avoid when equipment fires occur.
- **Boiler Explosions**
  - Describe some of the basic causes of boiler explosions.
  - Explain what operators can do to help prevent boiler explosions.
  - Describe some situations that can cause a loss of all boiler flame.
  - Describe some basic procedures for preventing a loss of all boiler flame.

Content:

- Common Problems
  - Loss of Auxiliaries
  - Leaks
  - Overpressure
  - Equipment Fires
- Boiler Explosions
  - Causes of Explosions
  - Loss of Flame

Operations

Combustion and Boiler Operation

Description:

The requirements for combustion in a boiler are identified and described. This unit traces the air and gas flow path through a typical boiler and describes the functions of the components in the flow path. Principles of boiler operation from an operator's point of view are identified and described.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBCO

Objectives:

- **Combustion**
  - List elements needed for combustion in a boiler.
  - Describe the parts and function of a typical burner in a boiler furnace and howthe burner helps to satisfy the elements of combustion in a boiler.
  - Describe the fuel system for a typical coal-fired boiler.
  - Describe a typical burner for an oil-fired boiler.
  - Describe a typical burner for a gas-fired boiler.
  - Define the following terms: fuel/air ratio, excess air, and excess oxygen.
  - Describe operator responsibilities associated with maintaining the correct fuel/air ratio.
- **Air and Gas**
  - Trace the air and gas flow path through a boiler.
  - Explain how hot combustion gases are used to increase boiler efficiency.
  - Describe the basic operation of two types of air preheaters.
  - Describe some of the harmful effects that can be caused by combustion gas by-products.
  - Describe equipment commonly used to remove p

Content:

- Combustion
  - Elements of Combustion
  - Boiler Fuel Systems
  - Fuel/Air Ratio
- Air and Gas
  - Air and Gas Flow Path
  - Pollution Controls
- Boiler Operation
  - Vents, Drains, and Blowdown Valves
  - Soot blowing

Operations

Condensate and Feedwater Systems

Description:

This interactive training unit is designed to familiarize trainees with the basic layout of a typical condensate and feedwater system and the basic operation of the system's individual components. After completing this unit, trainees should be able to identify the components in a condensate and feedwater system and describe the basic operation of each component. They should also be able to explain how the system normally operates, describe operator responsibilities associated with normal operation, and identify some common operating problems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOCFS

Objectives:

- **System Overview**
  - Describe the basic layout of a typical condensate and feedwater system.
  - Describe the basic function and operation of the individual components in a typical condensate and feedwater system.
- **System Operation**
  - Describe the normal operation of a typical condensate and feedwater system and identify typical operator responsibilities that are associated with normal operation.
  - Identify and describe some common operating problems that may occur in a condensate and feedwater system and describe basic steps for dealing with these problems.

Content:

- System Overview
  - System Layout
  - System Components
- System Operation
  - Normal Operation
  - Operating Problems

Operations

Condenser and Circulating Water

Description:

This training unit provides basic information about the design and function of power plant condensers and circulating water systems. It describes the operation of a single-pass condenser and a two-pass condenser, as well as various air removal system components. The unit also covers the basic operation of a once-through circulating water system, and it describes how mechanical draft cooling towers and natural draft cooling towers work.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPPC

Objectives:

- **Condensers**
  - Describe the basic function of a condenser.
  - Describe the operation of a single-pass condenser and a two-pass condenser.
  - Describe the basic function of an air removal system.
  - Describe the operation of a reciprocating vacuum pump, a rotary vacuum pump and an air ejector.
  - Identify and describe routine checks that operators should perform on a condenser.
- **Circulating Water Systems**
  - Describe the basic operation of a once-through circulating water system.
  - Describe how mechanical draft cooling towers and natural draft cooling towers function.

Content:

- Condensers
  - Function and Design
  - Air Removal Systems
  - Condenser Operation
- Circulating Water Systems
  - Once-Through Systems
  - Cooling Towers

Operations

Normal Operations of Boilers

Description:

This is an interactive module designed to present an overview of the basic procedures for normal operations of a drum-type boiler. Trainees will learn what is meant by steady state conditions and efficiency, the basic instrumentation used to monitor the operation of a boiler, how steam temperature is controlled, and the basic procedures for ash handling.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBNO

Objectives:

- **Overview**
  - Explain what steady state conditions for a boiler are.
  - Describe some of the systems and components that must be monitored during boiler operation under steady state conditions.
  - Describe typical operator concerns associated with the energy losses that occur during normal operation of a boiler.
- **Monitoring and Controlling Operations**
  - Describe basic operator responsibilities for monitoring a boiler's steam/water circuit.
  - Describe typical control room instrumentation that is used to monitor a boiler's steam/water circuit.
  - Describe basic operator responsibilities for monitoring combustion and the air/gas circuit for a boiler.
  - Describe typical control room instrumentation that is used to monitor combustion and the air/gas circuit for a boiler.
  - Describe some of the basic systems and components checks that operators perform during normal boiler operation.
  - Describe f

Content:

- Overview
  - Steady State Conditions
  - Energy Losses
- Monitoring and Controlling Operations
  - The Steam/Water Circuit
  - The Air/Gas Circuit
  - Steam Temperature
- Ash Handling
  - Bottom Ash
  - Fly Ash

Operations

Startup and Shutdown of Boilers

Description:

This is an interactive training module designed to familiarize trainees with basic techniques for starting up and shutting down drum-type boilers. After completing this module, the trainees should be able to describe basic procedures for performing a cold startup of a drum-type boiler, lighting off the furnace, warming up the boiler and establishing the boiler flame. They should also be able to describe basic procedures for shutting down a typical drum-type boiler. In addition, the trainees should be able to compare and contrast the startup and shutdown of a drum-type boiler with the startup and shutdown of a once-through boiler.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBSS

Objectives:

- **Basic Procedures**
  - Describe basic checks that boiler operators make during an initial pre-startup walkthrough.
  - Describe typical procedures for a cold startup of a controlled circulation, drumtype boiler.
  - Describe basic preparations for lighting off the furnace, how light-off is initiated, and how a typical boiler is warmed up.
  - Describe how pulverizers are started up and controlled.
  - Describe how the main coal burners are ignited and controlled.
  - Describe the basic procedures for shutting down a typical drum-type boiler.
- **Once-Through Boilers**
  - Describe the basic differences and similarities between the operation of a oncethrough boiler and a drum-type boiler.
  - Describe how a steam/water separation system is used during the startup and the shutdown of a once-through boiler.

Content:

- Basic Procedures
  - Cold Startup
  - Light-off and Warmup
  - Establishing a Boiler Flame
  - Shutdown
- Once-Through Boilers
  - Basic Operations
  - Steam/Water Separation

Operations

Water and Steam

Description:

This unit begins by explaining why water circulates in a boiler, and describes the flow path of water through a typical drum-type boiler. Differences between natural circulation and controlled circulation are explained, and the components and functions of a typical boiler drum are examined. The unit goes on to explain how the components found in a steam flow path affect the production and use of steam. The unit concludes with a look at what the critical point is, and why some boilers operate at or above critical conditions. Also covered is the operator's role in maintaining the correct steam pressure in drum-type and once-through boilers.

Duration:

2 hours

Course Code:

IHRDC_OM_AOBWS

Objectives:

- **Water**
  - State the purposes of water circulation in a boiler.
  - Describe the water flow path through a typical drum-type boiler.
  - Describe the basic principle of natural circulation and two factors that can affect it.
  - Describe the differences between natural and controlled circulations.
  - Describe the functions and components of a typical boiler drum.
- **Steam**
  - Define: boiling, saturation, temperature, and superheat.
  - Describe the steam flow path from the boiler to the condenser in a typical generating unit.
  - State the function of a superheater and describe how superheaters can be classified.
  - State the function of a desuperheater.
  - State the function of a reheater and describe how reheaters can be classified.
  - Describe the basic operation of a condenser.
- **Supercritical Boilers**
  - Define critical point.
  - Explain why some

Content:

- Water
  - Water Flow Path
  - Circulation
  - Boiler Drum
- Steam
  - Introduction
  - Steam Flow Path
- Supercritical Boilers
  - Critical Conditions
  - Once-Through Boilers
  - Boiler Operations

Operations

Basic Distillation System Components and Operation

Description:

This interactive training unit is designed to familiarize trainees with the basic components and operation of a typical distillation system. After completing the unit, trainees should be able to describe the functions of the major components of a distillation system and describe how the distillation process occurs in a distillation tower. They should also be able to explain how refluxing and reboiling affect product purity and how bubble caps and packing affect the distillation process in distillation towers. In addition, trainees should be able to explain why it is important to monitor and control distillation tower temperatures and pressures.

Duration:

2 hours

Course Code:

IHRDC_OM_AODBS

Objectives:

- **Basic Distillation System**
  - List and explain major equipment functions in a typical distillation system.
  - Define overhead product, bottoms product, and boil-up.
  - Describe the basic operation of a distillation tower.
  - Explain how a typical sieve-type distillation tower operates.
  - List and explain the purpose of the three sections of a distillation tower.
  - Define fractionation.
  - Explain how refluxing and reboiling help minimize overlap.
  - Define external reflux and internal reflux.
  - Explain how packed towers differ from distillation towers using bubble caps.
  - Compare and contrast the operation of bubble caps and packing grids.
- **Temperature and Pressure**
  - Describe adjustments made when product purity is unacceptable.
  - Identify critical temperature points in a distillation tower.
  - Describe the effects of incorrect temperatures at various points in a distillation

Content:

- Basic Distillation System
  - Introduction to Distillation Systems
  - Tower Operation
  - Refluxing and Reboiling
  - Bubble Caps and Packing
- Temperature and Pressure
  - Temperature
  - Pressure

Operations

Basic Principles of Distillation

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of the distillation process. After completing this unit, trainees should be able to explain how changes in the state of matter relate to the distillation process and how these changes are affected by temperature and pressure. They should also be able to explain how a liquid mixture can be separated into lighter and heavier components by distillation, and be able to describe the basic operation of single-batch distillation systems, successive-batch distillation systems, and continuous distillation systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AODBP

Objectives:

- **Principles of Distillation**
  - Explain how changes in temperature and pressure affect the boiling point of a substance.
  - Define distillation.
  - Explain how changes in the state of matter relate to the distillation process.
  - Define: sensible heat, initial boiling point, boiling range, final boiling point, and latent heat.
  - Define: vapor pressure, external pressure, partial pressure, and relative volatility.
  - Explain the relationship between vapor pressure and the following: boiling point, temperature, and external pressure.
- **Distillation Processes**
  - Explain how a liquid mixture can be separated into lighter and heavier components by distillation.
  - Describe the characteristics of liquid mixtures that make distillation possible.
  - Describe the basic operation of single-batch, successive-batch, and continuous distillation systems.

Content:

- Principles of Distillation
  - States of Matter
  - Heat
  - Pressure
- Distillation Processes
  - Separation of Liquid Mixtures
  - Batch
  - Continuous

Operations

Distillation Control Systems

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of operation of systems that control distillation processes. After completing this unit, trainees should be able to describe typical material balance and energy balance control loops and explain how these control loops respond to process disturbances. They should also be able to describe how a distillation tower is operated to maintain product specifications.

Duration:
2 hours

Course Code:
IHRDC_OM_AODCS

Objectives:

- **Balances**
  - Explain what is meant by material balance and identify typical variables.
  - Explain what is meant by energy balance and identify typical variables.
  - Describe typical material balance and energy balance control loops.
  - Define steady state operation and process disturbance.
  - Describe how a typical distillation tower control system responds to a process disturbance (change in feed composition).
- **Process Temperatures**
  - Describe how a typical distillation tower control system responds to an increase in bottom temperature.
  - Explain how the following conditions affect the composition of a distillation system's overhead and bottom products: increase in bottom temperature, decrease in bottom temperature, and change in external reflux.
- **Product Composition**
  - Explain the difference between direct and indirect composition measurements.
  - Expl

Content:

- Balances
  - Material Balance
  - Energy Balance
  - Process Disturbances
- Process Temperatures
  - Bottom Temperature
  - External Reflux
- Product Composition
  - Product Specifications
  - Maintaining Specifications

Operations

Distillation Operating Problems

Description:

This interactive training unit is designed to familiarize trainees with some of the problems that can occur during the operation of distillation systems. After completing this unit, trainees should be able to describe problems that can occur when the amount of reflux going back to the column is incorrect, and when the reboiler in a distillation system is operated improperly.

Duration:

2 hours

Course Code:

IHRDC_OM_AODOP

Objectives:

- **Feed Problems**
  - Explain the role of the feed rate in maintaining column equilibrium.
  - Identify problems that can occur when the feed rate is incorrect.
  - Describe conditions that can lead to three operating problems: overloading, flooding, and puking.
  - Describe some mechanical causes of overloading.
  - Explain how to identify a flooded condition in a distillation tower.
  - Explain how a liquid flood can be broken.
  - Explain how flooding can be prevented or controlled.
  - Identify process disturbances that can result from changes in the feed to a distillation tower.
  - Identify problems that can show up during startup.
- **Reflux Problems**
  - Define reflux.
  - Describe what can happen if the amount of reflux going back to the column is not correct.
  - Identify typical disturbances that can occur in shell and tube condensers and fin-fan condensers.
- **Reboiler Pr**

Content:

- Feed Problems
  - Feed Control
  - Overloading
  - Other Problems
- Reflux Problems
  - Improper Reflux
  - Condenser Problems
- Reboiler Problems
  - Reboiler Purpose
  - Improper Operation
  - Overfractionation

Operations

Distillation System Startup and Shutdown

Description:

This interactive training unit is designed to familiarize trainees with basic procedures for starting up and shutting down a distillation system. After completing this unit, trainees should be able to describe pre-startup checks that are commonly made on a vacuum distillation system and describe what takes place during a typical startup procedure. They should also be able to describe general procedures for short-term, emergency, and long-term shutdowns.

Duration:
2 hours

Course Code:
IHRDC_OM_AODSS

Objectives:

- **Startup**
  - Briefly describe the distillation process.
  - State the purpose of pre-startup checks.
  - List pre-startup checks commonly made on a vacuum distillation system.
  - Describe what takes place during a distillation startup procedure.
- **Shutdown**
  - Describe a typical short-term shutdown procedure.
  - Describe a typical emergency shutdown procedure.
  - Describe a typical long-term shutdown procedure.

Content:

- Startup
  - System Overview
  - Pre-Startup Checks
  - Startup Procedures
- Shutdown
  - Short-Term Shutdown
  - Long-Term Shutdown

Operations

Towers, Reboilers, and Condensers

Description:

This interactive training unit is designed to familiarize trainees with the basic principles of operation of distillation towers, reboilers, and condensers. After completing this unit, trainees should be able to describe the difference between a binary tower and a multidraw tower and explain why the physical dimensions of a tower can vary. They should also be able to explain why vacuum distillation and azeotropic distillation are used, and how various types of reboilers and condensers are used in distillation systems.

Duration:
2 hours

Course Code:
IHRDC_OM_AODTR

Objectives:

- **Towers and Processes**
  - Describe the major difference between a binary tower and a multidraw tower.
  - Describe the basic operation of a side-draw tower.
  - Describe three factors that affect the physical dimensions of a distillation tower.
  - Given the name of a distillation tower, describe the tower's main function.
  - Give three basic reasons why vacuum distillation is used.
  - Explain what an azeotropic mixture is and identify two methods of azeotropic distillation.
- **Reboilers and Condensers**
  - Explain the difference between the following types of reboilers: forced versus natural circulation and external versus internal.
  - Describe two ways that condensers can be categorized in overhead systems.

Content:

- Towers and Processes
  - Multidraw Towers
  - Tower Variations
  - Vacuum Towers
  - Azeotropic Distillation
- Reboilers and Condensers
  - Reboilers
  - Condensers

Operations

Introduction to Furnaces

Description:

This interactive training unit is designed to introduce trainees to the basic concepts associated with furnace operation. After completing the unit, trainees should be able to identify the major parts of a furnace and describe, in general terms, how a furnace produces heat. They should also be able to explain how heat transfer occurs in a furnace, and how air, combustion gases, and process fluid moves through different types of furnaces.

Duration:
2 hours

Course Code:
IHRDC_OM_AOFIN

Objectives:

- **Fundamentals**
  - Identify the major parts of a furnace.
  - Identify the major furnace systems.
  - Explain how a furnace produces heat.
- **Combustion**
  - State the requirements for combustion.
  - Identify three types of heat transfer and how they occur in a furnace.
- **Furnace Flow Paths**
  - Define draft.
  - Describe the basic operating principles of natural draft furnaces, forced draft furnaces, and balanced draft furnaces.
  - Explain how draft is controlled in a natural draft furnace.
  - Explain how process fluid circulates in a furnace.
  - Identify problems associated with improper process fluid flow.

Content:

- Fundamentals
  - Components
  - Operation
- Combustion
  - Fundamentals
  - Heat Transfer
- Furnace Flow Paths
  - Draft
  - Process Fluid

Operations

Furnace Operating Conditions

Description:

This interactive training unit is designed to familiarize trainees with general operator responsibilities associated with operating a furnace. After completing this unit, trainees should be able to identify instrumentation used to monitor furnace temperature control systems and process fluid control systems. They should also be able to identify conditions that should be checked during furnace operations, and explain how to detect and respond to abnormal conditions.

Duration:
2 hours

Course Code:
IHRDC_OM_AOFOC

Objectives:

- **Instrumentation and Control**
  - Identify the instrumentation used to monitor furnace operating conditions.
  - Describe the basic operating principles of furnace temperature control systems and process fluid control systems.
- **Inspection and Adjustments**
  - Identify conditions that should be inspected during furnace operation.
  - Explain how to detect burner problems and make the appropriate burner adjustments.
- **Abnormal Conditions**
  - Explain how to detect and respond to these furnace air flow problems: air leaks, insufficient air flow, and afterburning.
  - Explain how to operate a furnace at reduced firing rates.
  - Explain how to detect and respond to freeze-ups in the fuel supply system and process fluid system.

Content:

- Instrumentation and Control
  - Instrumentation and Process Variables
  - Control Systems
- Inspection and Adjustments
  - Furnace Inspection
  - Burner Adjustments
- Abnormal Conditions
  - Air Flow Problems
  - Fuel System Problems
  - Process Fluid Problems

Operations

Furnace Startup and Shutdown

Description:

This interactive training unit is designed to familiarize trainees with basic procedures for starting up and shutting down a furnace. After completing this unit, trainees should be able to describe basic procedures for preparing a furnace for startup, establishing the flow of process fluid, and lighting the burners. They should also be able to describe general considerations and basic procedures associated with planned furnace shutdowns and unplanned, or emergency, furnace shutdowns.

Duration:
2 hours

Course Code:
IHRDC_OM_AOFSS

Objectives:

- **Startup**
  - Describe the major operator responsibilities involved in preparing furnace startup.
  - Explain how and why a furnace is purged.
  - Describe how to establish the flow of process fluid in a furnace.
  - Describe how to light gas burners, oil burners, and combination burners.
  - Describe a typical startup procedure for natural draft and balanced draft furnaces.
- **Shutdown**
  - Describe a typical planned shutdown procedure.
  - Identify furnace conditions that may require an emergency, or unplanned shutdown.
  - Identify typical emergency shutdown systems and equipment.

Content:

- Startup
  - Preparations
  - Establishing Flow
  - Lighting Burners
- Shutdown
  - Planned Shutdown
  - Emergency Shutdown

Operations

Introduction to Heat Exchangers

Description:

This interactive training unit is designed to introduce trainees to basic principles of heat transfer and the components and operating principles of shell and tube, and plate heat exchangers. After completing this unit, trainees should be able to explain what heat is, and describe three ways that heat transfer can occur in a heat exchanger. They should also be able to describe the basic operation and components of a shell and tube heat exchanger, and identify auxiliary equipment that is commonly used with heat exchangers. Finally, trainees should be able to explain how a plate heat exchanger operates and identify its components.

Duration:

2 hours

Course Code:

IHRDC_OM_AOHIN

Objectives:

- **Principles**
  - Define heat.
  - Explain heat transfer by conduction, convection, and radiation.
  - Explain how heat is transferred in a typical heat exchanger.
  - Explain how various factors can affect heat transfer.
- **Shell and Tube**
  - Describe the operation of typical shell and tube heat exchangers.
  - Explain how heat exchangers are used as coolers and heaters.
  - Describe the functions of the auxiliary components used with heat exchangers.
  - Describe the different flow paths fluids take in shell and tube heat exchangers.
- **Plate**
  - Describe the basic operation of a plate heat exchanger.
  - Identify the components of a typical plate heat exchanger.

Content:

- Principles
  - Heat and Heat Transfer
  - Heat Transfer Factors
- Shell and Tube
  - Basic Operation
  - Auxiliary Equipment
  - Flow Paths
- Plate
  - Operation
  - Components

Operations

Condensers and Reboilers

Description:

This interactive training unit is designed to introduce trainees to the basic operation of condensers and reboilers. After completing this unit, trainees should be able to describe the function and operation of a typical condenser, basic procedures for starting up and shutting down a condenser, and some operator checks that are typically performed during condenser operation. They should also be able to explain the operation of kettle-type and thermosiphon reboilers, and identify some operator responsibilities associated with reboiler operation.

Duration:

2 hours

Course Code:

IHRDC_OM_AOHCR

Objectives:

- **Condensers**
  - Describe the function of condensers.
  - Describe the operation of a typical condenser.
  - Describe the startup procedure for a typical condenser.
  - Describe a general condenser shutdown procedure.
  - Describe some checks made during the operation of a condenser.
- **Reboilers**
  - Describe how a kettle-type reboiler operates.
  - Describe how a thermosiphon reboiler operates.
  - Describe some operator responsibilities associated with reboiler operation.

Content:

- Condensers
  - Condenser Operation
  - Condenser Startups and Shutdowns
  - Operator Checks
- Reboilers
  - Kettle-Type Reboilers
  - Thermosiphon Reboilers
  - Operator Responsibilities

Operations

Cooling Towers

Description:

This interactive training unit is designed to introduce trainees to the basic operation of a cooling water system and various types of cooling towers. After completing this unit, trainees should be able to explain how cooling occurs in a cooling tower, and describe the general design and operation of natural-draft and mechanical-draft cooling towers. They should also be able to describe general procedures for shutting down and starting up one cell of a multicell cooling tower. In addition, trainees should be able to describe operator checks that are typically performed on cooling towers, the effects of contaminants on cooling water, and how chemicals can be safely added to cooling water systems.

Duration:

2 hours

Course Code:

IHRDC_OM_AOHCT

Objectives:

- **Introduction**
  - Describe the operation of a basic cooling water system.
  - Describe what occurs in the tower during the cooling process.
  - Describe the general operation of a natural-draft cooling tower and the two types of mechanical-draft cooling towers: induced-draft towers and forced-draft towers.
- **Operation**
  - Describe a typical shutdown and startup procedure for one cell of a multicell cooling tower.
  - Describe typical operator checks for cooling towers.
- **Chemistry**
  - Explain what suspended and dissolved solids are and how they affect a cooling water system.
  - Explain how problems caused by suspended and dissolved solids can be minimized.
  - Explain what dissolved gases and micro-organisms are, how they affect cooling water systems, and how their effects can be minimized.
  - Describe ways chemicals are added to cooling water systems.
  -

Content:

- Introduction
  - Cooling Systems
  - Cooling Tower Design
- Operation
  - Cell Shutdown and Startup
  - Operator Checks
- Chemistry
  - Cooling Water Contamination
  - Chemical Addition

Operations

Operation of Shell- and Tube-Type Heat Exchangers

Description:

This interactive training unit is designed to familiarize trainees with the startup, operation, and shutdown of shell and tube heat exchangers. After completing this unit, trainees should be able to describe general procedures for the startup and shutdown of a shell and tube heat exchanger and identify some of the operator responsibilities associated with their operation. Trainees should also be able to identify basic operating problems that may be associated with shell and tube heat exchangers, and explain how they can be corrected.

Duration:

2 hours

Course Code:

IHRDC_OM_AOHOS

Objectives:

- **Startup and Shutdown**
  - Describe a general procedure for starting up a shell and tube heat exchanger.
  - Describe a general procedure for shutting down a shell and tube heat exchanger.
  - Describe general operator responsibilities associated with the operation of a shell and tube heat exchanger.
- **Heat Exchanger Problems**
  - Explain what fouling is and how it can be corrected.
  - Explain what leakage is and how it can be corrected.
  - Explain what air or vapor binding is and how it can be corrected.

Content:

- Startup and Shutdown
  - Startup
  - Shutdown
  - Operator Responsibilities
- Heat Exchanger Problems
  - Fouling
  - Tube Leaks
  - Air and Vapor Binding

Operations

Basic Pump Types and Operation

Description:

This interactive training unit is designed to introduce trainees to the basic components and operation of positive displacement pumps and centrifugal pumps. After completing this unit, trainees should be able to explain how pumps can be identified, identify the basic components of a pump, and describe the functions of various types of pump auxiliary equipment and systems. They should also be able to describe the general operation of reciprocating and rotary positive displacement pumps, and single-stage and multistage centrifugal pumps.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPBT

Objectives:

- **Pump Fundamentals**
  - Given a simple system diagram, locate each pump, tell what it does, and identify it by one or more names.
  - Identify the casing, the inlet, and the outlet on a pump.
  - Name two general categories of pumps.
  - Explain the functions of the following types of pump auxiliary equipment and systems drivers, couplings, strainers, lubricating systems, packing, and mechanical seals.
- **Positive Displacement Pumps**
  - Describe the general operation of a reciprocating positive displacement pump.
  - Describe the general operation of a rotary positive displacement pump.
- **Centrifugal Pumps**
  - Describe the general operation of a single-stage centrifugal pump.
  - Describe the general operation of a multistage centrifugal pump.

Content:

- Pump Fundamentals
  - Pump Identification
  - Pump Components
  - Auxiliary Equipment
- Positive Displacement Pumps
  - Reciprocating Pumps
  - Rotary Pumps
- Centrifugal Pumps
  - Single-Stage Pumps
  - Multistage Pumps

Operations

Fundamentals of Centrifugal Pumps

Description:

This interactive training unit is designed to introduce trainees to the fundamental operating principles of single-stage and multistage centrifugal pumps. After completing this unit, trainees should be able to describe the general operating principles of a centrifugal pump. Specifically, they should be able to describe the differences between radial, axial, and mixed flow pumps, and describe the basic operation of a vertically-mounted and multistage pump. Trainees should also be able to describe the purpose and the basic operation of a mechanical seal flush system.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPFC

Objectives:

- **Centrifugal Pump Operation**
  - Describe general operating principles of a centrifugal pump.
  - Explain differences between radial flow, axial flow, and mixed flow pumps.
  - Explain the principles of operation of a vertically mounted centrifugal pump.
  - Describe the basic operation of a typical multistage centrifugal pump.
  - Describe two ways that multistage centrifugal pumps can minimize axial thrust.
- **Centrifugal Pump Components**
  - Explain the differences between an open impeller, a closed impeller, and a semi-open impeller.
  - Compare and contrast a single-suction impeller and a double-suction impeller.
  - Describe the general design and function of a diffuser.
  - Describe the purpose and basic operation of a mechanical seal flush system.

Content:

- Centrifugal Pump Operation
  - Principles of Operation
  - Vertical Pumps
  - Multistage Pumps
- Centrifugal Pump Components
  - Impellers and Diffusers
  - Mechanical Seal Systems

Operations

Operation of Centrifugal Pumps

Description:

This interactive training unit is designed to familiarize trainees with the basic operation of centrifugal pumps. After completing this unit, trainees should be able to describe techniques for priming a centrifugal pump and explain general procedures for starting and shutting down a pump. Trainees should also be able to describe some general checks that may be made on an operating pump and describe operator concerns related to air and vapor binding in a centrifugal pump.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPOC

Objectives:

- **Startup and Shutdown**
  - Describe techniques used to prime a centrifugal pump.
  - Describe a procedure for starting up a centrifugal pump.
  - Describe a procedure for shutting down a centrifugal pump.
- **Pump Operation**
  - Describe checks that should be made on an operating centrifugal pump and its auxiliary equipment.
  - Describe indications of air binding and vapor binding in a pump and some of the possible sources of in-leakage to a pump.

Content:

- Startup and Shutdown
  - Priming
  - Pump Startup and Shutdown
- Pump Operation
  - Operator Checks
  - Air Binding and Vapor Binding

Operations

Performance and Inspection of Pumps

Description:

This interactive training unit is designed to introduce trainees to factors that affect the performance of pumps and some of the symptoms of improper pump operation. After completing this unit, trainees should be able to identify and explain the relationship between various factors that affect pump performance, and to explain how pump performance can be evaluated. They should also be able to identify symptoms of some common pump problems and explain how to check a pump for signs of problems such as leaks and cavitation.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPER

Objectives:

- **Pump Performance**
  - Define and explain the relationship between the following: static head, dynamic head, suction head, discharge head, and total head.
  - Describe some basic ways pump performance can be determined.
  - Explain the relationship between minimum net positive suction head and cavitation.
- **Pump Inspection**
  - Identify symptoms that may indicate abnormal pump operation.
  - Identify pump components that should be checked for leaks.
  - Describe common symptoms of cavitation.
  - List some ways to stop or minimize cavitation.

Content:

- Pump Performance
  - Head
  - Suction Head and Cavitation
- Pump Inspection
  - Symptoms of Pump Problems
  - Checking for Leaks
  - Checking for Cavitation

Operations

Reciprocating Positive Displacement Pumps

Description:

This interactive training unit is designed to familiarize trainees with the basic parts and operation of several types of reciprocating positive displacement pumps. After completing this unit, trainees should be able to describe the general operation of the following types of pumps: single-acting piston pumps, single-acting plunger pumps, double-acting piston pumps, duplex piston pumps, motor-driven diaphragm pumps, and air-operated diaphragm pumps. Trainees should also be able to describe a general procedure for starting up and shutting down a typical reciprocating pump, and to explain the function and operation of a relief valve.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPRE

Objectives:

- **Piston and Plunger Pumps**
  - Describe the general operation of a single-acting piston pump.
  - Describe the general operation of a plunger pump.
  - Describe the general operation of a double-acting piston pump.
  - Describe the general operation and an advantage of a duplex piston pump.
- **Diaphragm Pumps**
  - Describe the general operation of a motor-driven diaphragm pump.
  - Describe the general operation of an air-operated diaphragm pump.
- **Pump Operation**
  - Describe a general procedure for starting up a reciprocating pump.
  - Describe a general procedure for shutting down a reciprocating pump.
  - Explain the purpose of a relief valve.

Content:

- Piston and Plunger Pumps
  - Single-Acting Pumps
  - Double-Acting Pumps
  - Duplex Pumps
- Diaphragm Pumps
  - Motor-Driven Diaphragm Pumps
  - Air-Operated Diaphragm Pumps
- Pump Operation
  - Pump Startup and Shutdown
  - Relief Valves

Operations

Rotary Positive Displacement Pumps

Description:

This interactive training unit is designed to familiarize trainees with the basic parts and operation of several types of rotary positive displacement pumps. After completing this unit, trainees should be able to describe the general operation of the following types of pumps: screw pumps, gear pumps, lobe pumps, vane pumps, and tubing pumps. They should also be able to describe a general procedure for starting up and shutting down a typical rotary pump, and to explain the function and operation of a relief valve.

Duration:
2 hours

Course Code:
IHRDC_OM_AOPRP

Objectives:

- **Types of Rotary Pumps**
  - Describe the general operation of a progressive cavity pump.
  - Describe the general operation of a two-screw pump.
  - Describe the general operation of an external gear pump and an internal gear pump.
  - Describe the general operation of a lobe pump.
  - Describe the general operation of a sliding vane pump and a flexible vane pump.
  - Describe the general operation of a tubing pump.
- **Operating Procedures**
  - Describe procedures involved in starting up a rotary positive displacement pump.
  - Describe procedures involved in shutting down a rotary positive displacement pump.
  - Explain the purpose of a relief valve.

Content:

- Types of Rotary Pumps
  - Screw Pumps
  - Gear and Lobe Pumps
  - Vane Pumps
  - Tubing Pumps
- Operating Procedures
  - Rotary Pump Startup and Shutdown
  - Relief Valves

Operations

Basic Concepts of Refrigeration Systems

Description:

This interactive training unit is designed to introduce trainees to some of the basic principles of refrigeration system operation. After completing this unit, trainees should be able to explain what refrigeration is and how heat transfer occurs in a refrigeration system. They should also be able to describe the basic parts, or steps, of a refrigeration cycle and explain how these steps can be carried out by specific refrigeration system components.

Duration:
2 hours

Course Code:
IHRDC_OM_AORBC

Objectives:

- **Fundamentals**
  - Define refrigeration.
  - Explain what a refrigerant is.
  - Explain the basic difference between sensible heat transfer and latent heat transfer.
  - Describe how pressure and temperature can affect heat transfer.
  - Define heat source and heat sink.
- **Refrigeration Systems**
  - Describe the processes involved in a typical refrigeration cycle.
  - Describe the devices that accomplish the basic functions of a typical refrigeration cycle.
  - Explain how a refrigeration system can be used with a secondary cooling system.

Content:

- Fundamentals
  - Introduction to Refrigeration
  - Heat Transfer
- Refrigeration Systems
  - Basic Refrigeration Cycle
  - Refrigeration Components
  - Secondary Cooling Systems

Operations

Operations of Refrigeration Systems

Description:

This interactive training unit is designed to familiarize trainees with the operation of vapor compression refrigeration systems and absorption refrigeration systems. After completing this unit, trainees should be able to describe the components and operations of a vapor compression system and an absorption system. They should also be able to describe control devices, indicating instruments, and operator checks associated with these systems, and identify some operating problems that may occur.

Duration:
2 hours

Course Code:
IHRDC_OM_AOROP

Objectives:

- **Types of Systems**
  - Identify the components of a typical vapor compression refrigeration system.
  - Describe the operation of a vapor compression refrigeration system.
  - Describe the operation of one type of absorption refrigeration system.
- **System Operation**
  - Describe some control devices commonly used with refrigeration systems.
  - Describe some monitoring and indicating instruments commonly used with refrigeration systems.
  - Describe some operator checks commonly performed on a refrigeration system.
  - Identify some operating problems that may occur in a typical refrigeration system.

Content:

- Types of Systems
  - Vapor Compression System
  - Absorption System
- System Operation
  - Controls
  - Indicators and Checks
  - Operating Problems

Operations

Refrigeration Systems, Part 1

Description:

Refrigeration systems have a wide range of applications in industry and in daily living. In industry, liquids, gases, and machinery are cooled in order to control the temperatures involved in certain processes. Industrial facilities usually have several process systems, involving heating, cooling, and condensing, that use the principles of refrigeration to assist in system operation. This course covers applications of refrigeration in process industries.

Duration:
1 hour

Course Code:
IHRDC_OM_OTRS1

Objectives:

- **Theory**
  - Define refrigeration.
  - Explain the basic difference between sensible heat transfer and latent heat transfer.
  - Describe how pressure and temperature can affect heat transfer.
  - Define heat source and heat sink.
  - Explain what a refrigerant is.
  - Describe the processes involved in a typical refrigeration cycle.
- **Refridgeration Systems**
  - Describe the devices that accomplish the basic functions of a typical refrigeration system.
  - Identify the components of a typical mechanical refrigeration system.
  - Describe the operation of a compression-type mechanical refrigeration system.
  - Explain how the operation of an absorption-type mechanical refrigeration system differs from the operation of a compression-type system.
  - Describe some control devices commonly used with refrigeration systems.
  - Describe some moni

Content:

- Introduction to Refrigeration
- The Refrigeration Cycle
- Mechanical Refrigeration Systems
- Refrigeration System Controls and Applications
- Factors Affecting Operation
- Operating Checks

Operations

Refrigeration Systems, Part 2

Description:

Industrial air conditioning systems are designed to do more than just cool air. They typically provide air temperature control (heating or cooling), air movement and ventilation, air cleaning, and, in many cases, air moisture control. The systems that are used to condition air in industrial facilities are actually heating, ventilation, and air conditioning systems. This course covers all components for these systems, as well as important inspection procedures to keep systems running efficiently.

Duration:
1 hour

Course Code:
IHRDC_OM_OTRS2

Objectives:

- Introduction to Air Conditioning
  - Describe the following functions of a heating, ventilation, and air conditioning system:
  - Air temperature control.
  - Air movement and ventilation.
  - Air cleaning.
  - Air moisture control.
- Heating and Cooling
  - Describe how a heat pump can be used to warm or cool air by changing the path of air flow.
  - Describe how a heat pump can be used to warm or cool air by changing the route the refrigerant follows after it is discharged from the compressor.
- Air Movement and Ventilation
  - Describe the functions of the following ventilation system components:
    - Fans
    - Ducts
    - Dampers
  - Describe how a double-duct ventilation system differs from a single-duct system.
- Air Cleaning
  - Describe the functions of screens and filters in a heating, ventilation, and air

Content:

- Introduction to Air Conditioning
  - Functions of a Heating, Ventilation, and Air Conditioning System
- Heating and Cooling
  - Heat Pumps and the Path of Air Flow; Heat Pumps and Refrigerant Routes
- Air Movement and Ventilation
  - Ventilation System Components; Double-Duct and Single-Duct Systems
- Air Cleaning
  - Functions of Screens and Filters; Types of Filters
- Humidifying and Dehumidifying
  - Relative Humidity; Air Temperature and Water Vapor
- System Inspection
  - Inspecting Components in a Heating, Ventilation, and Air Conditioning System

Operations

Above Ground Storage Tanks, Part 1

Description:

This course provides information about several types of aboveground storage tanks, associated auxiliary equipment, and general safety concerns related to these tanks and the materials they contain.

Duration:

2 hours

Course Code:

IHRDC_OM_OTAGS1

Objectives:

- Basic Concepts
  - Explain what a tank farm is and identify the equipment and systems that it typically includes.
  - Describe four ways that aboveground storage tanks can be classified.
  - Define the following terms: storage tank, feed tank, charge tank, surge tank, rundown tank, blend tank, recovery tank, slop tank, jacketed tank, atmospheric tank, pressure tank, low pressure tank, high pressure tank, blanketed tank, fill line, suction line, manway, and manhole.
  - Describe some common concerns that operators should be aware of when working with aboveground storage tanks.
- Monitor and Control of Tanks
  - Identify ways of reducing hazards associated with aboveground storage tanks.
  - Define the following terms: toxicity, viscosity, volatility, flammable, combustible, lower explosive limit, upper explosive limit, flash point, and vapor space.
  - Describe typical features for monitoring and control

Content:

- Operator Responsibilities
  - Operator responsibilities and general safety concerns related to tank farm operations
- Routine Inspections
  - Routine in-service inspections of aboveground storage tanks and their related auxiliary equipment and systems
- Sampling
  - General preparations
  - Procedure for obtaining a sample through a gauge hatch on a cone roof tank or through a bleeder valve on a pressure tank.
- Topic IV: Gauging
  - Use automatic gauges and D/P cells to obtain level measurements on aboveground storage tanks
  - Manually gauge an external floating roof tank.

Operations

Above Ground Storage Tanks, Part 2

Description:

Process facilities use aboveground storage tanks to meet a variety of operating needs. Operators who work with these tanks need to know what their responsibilities are and how to carry them out safely. This course covers operator responsibilities in areas such as routine inspections, sampling, gauging, and material transfers.

Duration:
1 hour

Course Code:
IHRDC_OM_OTAGS2

Objectives:

- Operator Responsibilities
  - Describe typical operator responsibilities related to tank farm operations.
  - Describe general safety concerns associated with tank farm operations.
- Routine Inspections
  - Describe tasks typically associated with making routine in-service inspections of aboveground storage tanks and their related auxiliary equipment and systems.
- Sampling
  - Describe general preparations associated with sampling.
  - Describe a procedure for obtaining a sample through a gauge hatch on a cone roof tank.
  - Describe a procedure for obtaining a sample through a bleeder valve on a pressure tank.
- Gauging
  - Describe how operators can use automatic gauges and D/P cells to obtain level measurements on aboveground storage tanks.
  - Describe a procedure for manually gauging an external floating roof tan

Content:

- Operator Responsibilities
  - Tank Farm Operations; General Safety Concerns
- Routine Inspections
  - Tasks During In-service Inspections of Aboveground Storage Tanks
- Sampling
  - General Preparations
  - Sampling Through a Gauge Hatch; Sampling Through a Bleeder Valve
- Gauging
  - Automatic Gauges and D/P Cells; Manual Gauging Procedures

Operations

Above Ground Storage Tanks, Part 3

Description:

Tank farm operators typically perform tasks such as gauging, sampling, and making material transfers on a daily basis. Other tasks are performed only periodically. One of these periodic tasks is taking a storage tank out of service and bringing it back in service. This course describes the basic steps for taking an aboveground atmospheric tank out of service and putting it back in service.

Duration:

1 hour

Course Code:

IHRDC_OM_OTAGS3

Objectives:

- Fundamentals
  - State common reasons for taking aboveground storage tanks out of service.
  - Define the terms "decommissioning a tank" and "recommissioning a tank."
  - List the four main stages of a decommissioning and recommissioning operation for an aboveground storage tank and list the major steps for each stage.
- Safety and Environmental Concerns
  - Define the following terms: pyrophoric material, cold work, hot work, and confined space entry.
  - Describe major safety and environmental concerns associated with decommissioning and recommissioning an aboveground storage tank.
  - Describe the use of a formal permitting procedure during the decommissioning and recommissioning of an aboveground storage tank.
- Decommissioning a Tank
  - Define the following terms: isolating, blocking in, and blind.
  - Describe the major steps involved

Content:

- Fundamentals
  - Decommissioning and Recommissioning Tank Fundamentals
- Safety and Environmental Concerns
  - Major Safety and Environmental Concerns associated with decommissioning and recommissioning an aboveground storage tank.
  - Formal Permitting Procedure
- Decommissioning a Tank
  - Fundamentals of Decommissioning a Tank
- Preparing a Tank for Entry
  - Preparing a Decommissioned Tank for Entry by Personnel
- Working on a Decommissioned Tank
  - Cleaning and Repairing Decommissioned Tanks
- Recommissioning a Tank
  - Steps for Returning a Decommissioned Storage Tank to Service; Water Testing

Operations

Bearings and Operation

Description:

This interactive training unit is designed to familiarize trainees with basic principles associated with turbine shaft bearing lubrication, turbine speed control, and turbine operation. After completing this unit, trainees should be able to identify and describe the functions of the components of a typical turbine lube oil system. They should also be able to describe the basic components and operation of a typical turbine speed control system.
In addition, they should be able to describe operator responsibilities associated with turbine startup, operation, and shutdown.

Duration:
2 hours

Course Code:
IHRDC_OM_AOTBO

Objectives:

- **Bearing Lubrication**
  - State the functions of the following basic components typically found in a turbine lube oil system: reservoir, main lube oil pump, booster pump, and lube oil coolers.
  - State the functions of the following additional components typically found in a turbine lube oil system: AC auxiliary pump, DC emergency pump, AC turning gear pump, and vapor extractor.
  - Explain why it is important to make sure that the controllers for the standby oil pumps are in the standby or automatic positions.
  - Describe a situation in which increase in bearing oil temperature could indicate a problem.
  - Describe a situation in which an increase in bearing oil temperature is considered normal.
- **Turbine Control**
  - Identify two major systems commonly used to control turbine speed.
  - Describe the basic components of a turbine speed control system.
  - Describe how turbine speed is controlled by

Content:

- Bearing Lubrication
  - Basic Components
  - Additional Components
  - Operator Responsibilities
- Turbine Control
  - Basics
  - Example
- Turbine Operation
  - Startup
  - Normal Operation and Shutdown

Operations

Boiler and Turbine Protection

Description:

This unit describes the basic operation and startup requirements of a balanced-draft, controlled circulation, drum-type boiler. It also identifies common problems that affect the combustion side of a boiler and the water and steam side of a boiler, and it describes automatic controls and operator actions that address those problems. The unit goes on to describe common turbine problems, including temperature- and pressure-related problems, overspeed, vibration and eccentricity. Automatic protective devices and operator actions that address those problems are also described.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPB

Objectives:

- **Boilers**
  - Describe the basic operation of a balanced-draft, controlled circulation, drumtype boiler.
  - Identify and describe the basic requirements for starting up a boiler.
  - Identify common boiler combustion problems.
  - Describe automatic controls that regulate the combustion process.
  - Describe actions that operators can take to address combustion problems.
  - Identify automatic protective devices associated with the combustion process.
  - Identify common problems that occur on the water and steam side of a boiler.
  - Describe actions that operators can take to address water and steam problems.
  - Identify automatic protective devices associated with the boiler steam/water cycle.
- **Turbines**
  - Identify common temperature-related and pressure-related turbine problems.
  - Describe actions that operators can take to address turbine problems related to temperature and pressure.

Content:

- Boilers
  - Basic Operation and Startup
  - Combustion Problems
  - Water and Steam Problems
- Turbines
  - Temperature and Pressure Problems
  - Overspeed, Vibration and Eccentricity

Operations

Steam Flow and Steam Turbines

Description:

This interactive training unit is designed to familiarize trainees with the basic principles associated with the construction and operation of steam turbines. After completing this unit, trainees should be able to state the functions of the main parts of a typical turbine and describe how steam causes impulse blades and reaction blades to turn a turbine's wheels. They should also be able to describe the purpose and operation of a gland steam seal system, a gland steam seal exhaust system, a carbon seal, and a water seal.

Duration:
2 hours

Course Code:
IHRDC_OM_AOTSF

Objectives:

- **Construction and Rotation**
  - State the functions of the following turbine parts: wheels, blades, diaphragms, steam chest, nozzle block, and rotor.
  - State the functions of stop valves and control valves.
  - Describe how steam causes impulse blades to turn a turbine's wheels.
  - Describe how steam causes reaction blades to turn a turbine's wheels.
  - State the functions of reheat stop valves and intercept valves.
  - Define a turbine trip and describe how it protects a turbine.
- **Sealing Systems**
  - Describe the purpose for and operation of a gland steam seal system.
  - Describe the purpose for and operation of a gland steam seal exhaust system.
  - Describe the operation of a carbon seal.
  - Describe the operation of a water seal.

Content:

- Construction and Rotation
  - Construction
  - Rotation
- Sealing Systems
  - Steam Seals
  - Carbon and Water Seals

Operations

Steam Systems

Description:

This is an interactive training module designed to present basic information on the steam/water cycle in a power plant. Specific attention is directed to the main steam system, the reheat steam system, the extraction steam system and the auxiliary steam system. Basic procedures for a plant startup and several operator checks on steam systems and components are also included.

Duration:

2 hours

Course Code:

IHRDC_OM_AOPPS

Objectives:

- **Systems and Components**
  - Describe how steam flows through the various steam systems that make up a typical power plant's steam/water cycle.
  - Identify the components of a main steam system and describe their functions.
  - Identify the components of a reheat steam system and describe their functions.
  - Explain why steam piping contains expansion loops and bends.
  - Identify the components of an extraction steam system and describe their functions.
  - Explain how an extraction steam system improves plant efficiency.
  - Describe typical uses of auxiliary steam in a power plant.
  - Identify some typical components of an auxiliary steam system and describe their functions.
  - Describe how the components that control the pressure and temperature of auxiliary steam operate.
- **Systems Operations**
  - Describe some basic procedures for removing accumulated condensate and gradually warming up stea

Content:

- Systems and Components
  - Steam/Water Cycle
  - Main Steam System
  - Reheat Steam System
  - Extraction Steam System
  - Auxiliary Steam System
- Systems Operations
  - Plant Startup
  - Systems Inspections

Operations

Steam Traps

Description:

This interactive training unit is designed to familiarize trainees with the basic operation and maintenance of types of steam traps commonly found in industrial facilities. After completing this unit, trainees should be able to describe functions commonly performed by steam traps, describe common types of steam traps, and describe procedures for performing steam trap surveys and replacing worn or damaged steam trap components.

Duration:

2 hours

Course Code:

IHRDC_OM_AMPST

Objectives:

- **Basics**
  - Describe functions typically performed by steam traps.
  - Describe the components of a typical steam trap station.
- **Types of Steam Traps**
  - Describe the basic operation of two common types of mechanical steam traps: inverted bucket and float, and thermostatic.
  - Describe the basic operation of two common types of thermostatic steam traps: bellows and bi-metallic.Describe the basic operation of a typical thermodynamic disc-type steam trap.
- **Inspecting and Replacing**
  - Describe what to check for during a survey or inspection of a steam trap station.
  - Describe typical procedures for performing a temperature inspection, a sound inspection, and a visual inspection of a steam trap.
  - Describe a typical procedure for replacing worn or damaged steam trap components.

Content:

- Basics
  - Functions of Steam Traps
  - Steam Trap Stations
- Types of Steam Traps
  - Mechanical Traps
  - Thermostatic Traps
- Inspecting and Replacing
  - Surveying Steam Trap Stations
  - Surveying Steam Traps
  - Replacing Steam Traps

Operations

Auxiliary Vessels

Description:

Process facilities contain a number of process units, and each process unit, in turn, consists of one or more process systems. These process systems are made up of many different types of components, including various types of process vessels. A process operator's job involves working with all of the major parts of a process system, so operators must be familiar with the functions and features of different types of process vessels. This course focuses on a general group of vessels that can be referred to as auxiliary vessels.

Duration:
1 hour

Course Code:
IHRDC_OM_OTAXV

Objectives:

- **Overview**
  - Explain equipment and vessels that are typically used to carry out drying operations.
  - Identify and describe major parts of a process system and provide examples of included components.
  - Describe several types of storage vessels for solids, liquids, and gases.
  - Describe several types of mixing vessels.
- **Separation Techniques**
  - Explain how the use of separation techniques differs for primary and auxiliary vessels, and describe several types of separation vessels.
  - Describe auxiliary vessels that use centrifugal force to promote material separation.
  - Explain types of auxiliary vessels that use chemical reactions to separate materials.
  - Describe two types of vessels that use heat transfer for material separation.

Content:

- Overview
  - Equipment and vessels typically used to carry out drying operations
  - Major parts of a process system and examples of included components
  - Several types of storage vessels for solids, liquids, and gases
  - Several types of mixing vessels
- Separation Techniques
  - Different separation techniques for primary and auxiliary vessels, and several types of separation vessels
  - Auxiliary vessels that use centrifugal force to promote material separation
  - Types of auxiliary vessels that use chemical reactions to separate materials
  - Two types of vessels that use heat transfer for material separation

Operations

Fans

Description:

Many processes and systems in an industrial facility require the movement of air or other gases. Air movement is important in applications such as heating and cooling, pollution control, combustion, and ventilation. One of the most common ways to move air and other gases in a controlled manner is with fans. This course identifies the major components of fans and describes the operation of various types of fans. The operator's role in keeping fans working properly is also examined.

Duration:
30 minutes

Course Code:
IHRDC_OM_OTFAN

Objectives:

- **Overview**
  - Discuss the purpose of fans.
  - Describe how airflow is measured.
  - Identify axial fan designs.
  - Identify centrifugal fan designs.
- **Application and Maintenance**
  - Review operator safety checks for fan systems.
  - Discuss fan system components.

Content:

- Overview
  - Purpose of fans
  - Measure airflow
  - Axial fan designs
  - Centrifugal fan designs
- Application and Maintenance
  - Operator safety checks for fan systems
  - Fan system components

Operations

Filtration and Screening Unit Operations

Description:

This course focuses on the separation of mixtures by means of filtration and screening. The operation of devices used to accomplish filtration and screening are covered along with the operator's role and screening unit operations.

Duration:

30 minutes

Course Code:

IHRDC_OM_RCFSU

Objectives:

- **Overview**
  - Describe the basic principles of screening and filtering.
- **Screening Types**
  - Identify screen types, functions, and operation.
  - Describe cartridge filter operation.
  - Describe gravity and pressure filters.
  - Describe vacuum drum filter operation.
  - Describe pre-coat filter operation.

Content:

- Overview
  - Basic principles of screening and filtering
- Screening Types
  - Screen types, functions, and operation
  - Cartridge filter operation
  - Gravity and pressure filters
  - Vacuum drum filter operation
  - Pre-coat filter operation

Operations

Flaring, Venting, and Purging

Description:

Industrial process operations produce many different types of useful products. In many cases, however, these operations also produce waste materials that must either be recovered for reuse or safely discarded. Although waste materials may be solids, liquids, or gases, this course focuses on waste gases. Specific attention is directed to how waste gases are removed from process systems and safely disposed of.

Duration:
1 hour

Course Code:
IHRDC_OM_OTFVP

Objectives:

- General Considerations
  - Describe some considerations for handling waste gases.
  - Explain how a relief system can remove waste gas.
- Venting
  - Describe conditions that require venting.
  - Describe various types of vents.
  - Describe work practices that help ensure the safe venting of equipment and vessels.
- Purging
  - Explain why nitrogen and fuel gas are used for purging.
  - Describe two methods used to purge vessels and equipment.
  - Explain what inerting is and why and how it is done.
  - Describe safety concerns and operator responsibilities associated with purging.
- Flare System
  - Describe safety considerations associated with flaring.
  - Describe the main components and the basic operation of a flare.
- Flare Operations
  - Describe typical operator responsibilities associated with

Content:

- General Considerations
  - Waste Gases; Relief Systems
- Venting
  - Venting Fundamentals; Safe Venting of Equipment and Vessels
- Purging
  - Purging Fundamentals; Introduction to Inerting
- Flare System
  - Safety Considerations of Flaring; Basic Operation of a Flare
- Flare Operations
  - Flare System Startups; Operator Responsibilities with Flare Operation
  - Abnormal Flare Operating Conditions; Flare Shutdowns

Operations

Fundamentals of Process Solubility

Description:

This training module examines the basic concepts that relate to the processing of certain kinds of mixtures. Industrial applications of these concepts are also presented.

Duration:

1 hour

Course Code:

IHRDC_OM_OTFPS

Objectives:

- **Introduction to Solubility**
  - Compare and contrast heterogeneous mixtures, and homo-geneous mixtures.
  - Define the following terms: solution, solubility, solute, and solvent.
- **Concentration and Rate of Solution**
  - Define concentration and describe its varying degrees.
  - Define rate of solution
  - Describe how concentration and rate of solution are affected by the following factors: agitation, particle size, pressure, and temperature.
- **Crystalization**
  - Define crystallization.
  - Describe the stages of the crystalline process.
  - Describe two methods of crystal growth.
  - Describe the basic operation of a crystallization system.
- **Liquid Extraction**
  - Define liquid extraction.;
  - Describe factors that affect the efficiency of liquid extraction.
  - Desc

Content:

- Introduction to Solubility
  - Heterogeneous Mixtures and Homogeneous Mixtures.
- Concentration and Rate of Solution
- Crystalization
  - Crystal Structure, Crystal Formation and Industrial Crystallization System
- Liquid Extraction
  - Factors Affecting Efficient Liquid Extraction and Industrial Extraction
- Absorption
  - Factors that Affect Absorption; Typical Industrial Absorbers: Packed Columnm, Spray Chamber, Tray Column
- Adsorption
  - Adsorbents and Industrial Adsorption Systems
- Leaching
  - Basics Steps in Leaching; Factors Affecting Leaching; Leaching Systems

Operations

Material Handling of Bulk Liquids

Description:

Every day large quantities of liquid products are transported in and out of industrial facilities. These products are generally carried by tank trucks, tank cars, or barges. This course discusses how loading, unloading, and other transfers of bulk liquids must always be done safely and efficiently.

Duration:

1 hour

Course Code:

IHRDC_OM_OTMHB

Objectives:

- **Overview**
  - General procedures and safety concerns
  - Tank truck features and associated equipment
- **Tank Trucks**
  - Loading tank trucks
  - Unloading tank trucks
- **Tank Cars**
  - Loading tank cars
  - Unloading tank cars
- **Barges**
  - Unloading barges

Content:

- Overview
  - General procedures and safety concerns
  - Tank truck features and associated equipment
- Tank Trucks
  - Loading tank trucks
  - Unloading tank trucks
- Tank Cars
  - Loading tank cars
  - Unloading tank cars
- Barges
  - Unloading barges

Operations

Portable and Emergency Equipment

Description:

This training program focuses on common types of portable and emergency equipment that are found in industrial facilities. Some types of portable equipment are used to periodically analyze conditions in a process or inside process equipment. Other types of portable equipment, such as pumps, have specialized roles that are determined by plant procedures and policies. Emergency equipment, such as respirators and fire fighting equipment, is used strictly during emergencies.

Duration:
1 hour

Course Code:
IHRDC_OM_OTPEE

Objectives:

- **Oxygen Analyzers**
  - Describe the purpose of an analyzer.
  - Explain how to calibrate and use a typical oxygen analyzer.
- **Combustibles and Hazardous Gas Analyzers**
  - Explain how to calibrate, set up, and interpret a reading from a combustible analyzer.
  - Explain how to set up and use a hazardous gas analyzer.
- **pH, Temperature, and Vibration Analyzers**
  - Explain how to calibrate and use a pH analyzer.
  - Explain how to calibrate and use a thermocouple thermometer.
  - Explain how to use a vibration meter.
- **Portable Process Equipment**
  - Explain how to use a hand-operated drum pump.
  - Explain how to use an air-operated drum pump.
  - Explain the basic operations of a portable centrifuge.
- **Respirators:**
  - Describe general c

Content:

- Oxygen Analyzers
  - Oxygen Analyzer Parts and Functions and Operation
- Combustibles and Hazardous Gas Analyzers
- pH, Temperature, and Vibration Analyzers
- Portable Process Equipment
  - Hand-operated Drum Pumps, Air-operated Drum Pumps and Centrifuges
- Respirators
  - Air Purifying and Air-supplied Respirators
- Fire Protection Equipment and Systems

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