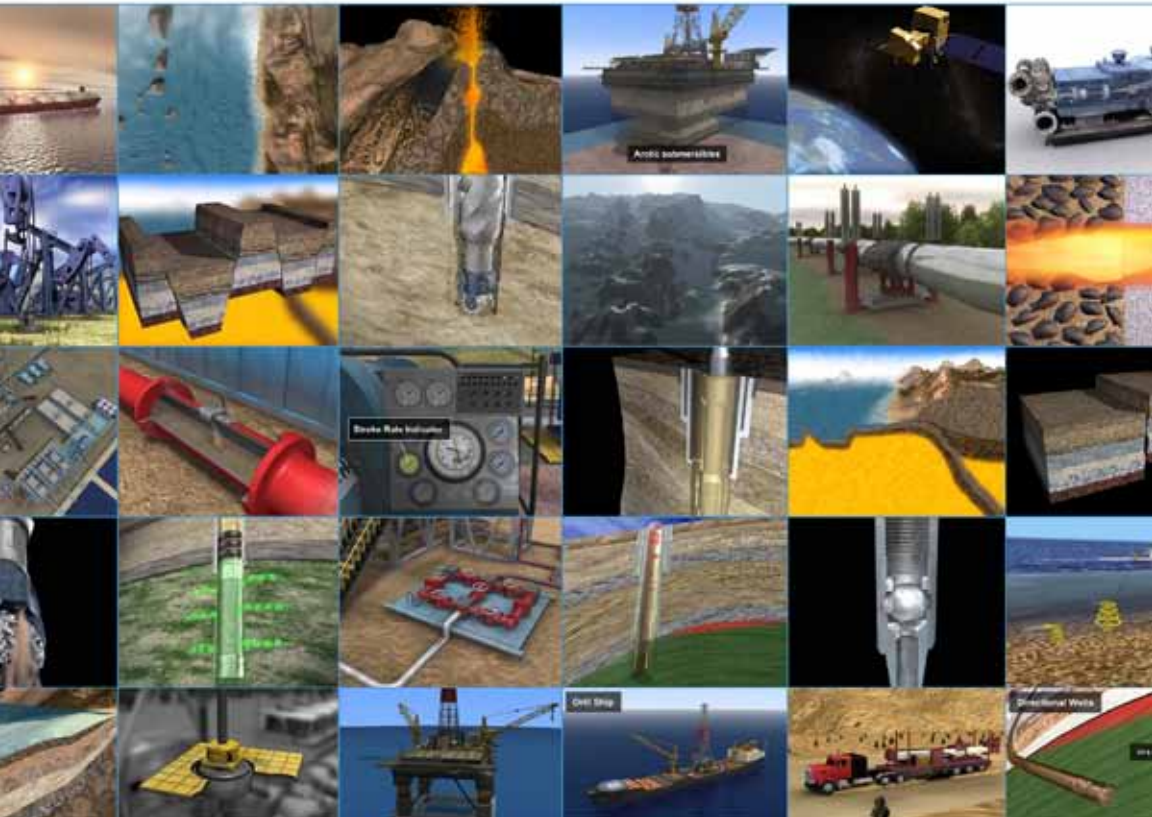


# PetroEd®

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## IADC ACCREDITED COURSES

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PetroEd offers the following courses accredited by the International Association of Drilling Contractors (IADC). The IADC is a global organization representing oil and gas interests for over 70 years. DIT curriculums feature introductions to the oil and gas industry, drilling operations and production operations. These programs will teach the concepts behind working in the petroleum industry, in drilling operations, and in production operations. Other IADC certificates awarded for completing PetroEd courses include Rig Pass and the introductory level of WellCAP. These courses allow drilling companies and contractors to put men on rigs while ensuring safe operations for everyone involved.

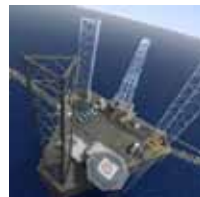
# INTRODUCTION TO THE PETROLEUM INDUSTRY (DIT)

LENGTH: 84 Hours CEU: 8.4 Credits LANGUAGES: EN



## OVERVIEW

The Introduction to the Petroleum Industry Program is accredited by the International Association of Drilling Contractors (IADC) and offers 84 hours of in-depth, online multimedia instruction originally developed by the industry for employee training. This unique eLearning course prepares job seekers around the world for oilfield positions and provides current employees and administrators a convenient way to stay up-to-date with industry developments. Upon successful completion of introduction to the Petroleum Industry, students receive an IADC Accredited Certificate.



## MODULE DESCRIPTIONS

### General Petroleum



**Basic Oilfield Mathematics** \ Basic Oilfield Mathematics covers general mathematical calculations likely to be encountered in the oilfield. The course takes a practical approach, featuring numerous examples for tubular weights and volumes, tank capacities, API gravity, downhole static pressure, and unit conversion from one unit to another. It covers basic physics concepts such as density and specific gravity. Effects of well deviation on measurement and pressure calculations are explained. Principles of pressure and force are illustrated. Advanced topics include fluid measurement and orifice metering calculations, and a few exercises on oilfield economics.



**Basic Principles of Petroleum** \ This course is designed for students who require a basic understanding of the petroleum industry to perform their jobs. It provides an easy-to-understand introduction to the basics of upstream and downstream activities. Students will learn how hydrocarbon deposits are formed, explored for, and produced. Students also learn how crude oil and gas are converted from a raw material into a finished product and delivered to markets, or traded worldwide as a commodity.



**Reservoir Engineering Primer** \ Reservoir Engineering Primer is divided into two computer-based training modules. The first part of the course aims to provide a general understanding of oil and gas reservoirs. The course explains the geologic processes of reservoir formation, then examines the origins of oil and gas. The characteristics of a reservoir and their contributions to reservoir quality are described in detail. The second module presents practical reservoir engineering techniques for calculating the original oil-in-place and gas-in-place in a reservoir. The student will learn methods of determining each of the parameters used in the reservoir volumetric equation: area, net pay, porosity, and water saturation.

### Production



**Perforating Fundamentals** \ This course on Perforating Fundamentals explains the basic concepts of perforating, including safety around explosives and the potential consequences of mistakes. It reviews topics related to shaped charges, including their design, completion, and detonation, as well as standoff, interference, and the manufacturing and performance of the shaped charge. The course then introduces perforating guns, including capsule guns, carrier guns, and pivot guns. Debris control and gun size are also discussed, along with tips on how to maximize clearance. The importance of the entrance hole diameter is reviewed. The course describes how perforating guns are run and fired in a well. A full range of firing systems and related equipment are discussed in the context of their field use. The course emphasizes safety procedures that must be followed in the field. It concludes with a review of supplemental equipment and perforating accessories.

## Health, Safety and Environment



**Oil Spill Volume Estimation** \ Oil Spill Volume Estimation introduces techniques for estimating the volume of an accidental oil spill. Determining the volume of accidental hydrocarbon discharge is rapidly becoming one of the most important aspects of maintaining an environmentally sound offshore production operation. Reporting the amount of accidentally-released oil in the environment during day-to-day operations (a legal requirement in most countries) has proven to be a major problem due to the non-intuitive manner in which hydrocarbons disperse over a body of water. The photographs used in this module are part of the comprehensive archives of the International Tanker Owners Pollution Federation (ITOPF) in London, and have been carefully categorized by the volume per unit area they represent. A systematic method of estimating the size of a spill is presented here in a clear, step-by-step set of procedures that can be used by field operators with no previous experience. A working knowledge of these techniques is also valuable for personnel in administrative and support roles, who may have to deal indirectly with the consequences of an accidental oil spill.



**Crane Safety** \ Crane Safety tackles the broad subject of offshore pedestal cranes and their safe operation. Students will learn to identify the key components of cranes, and to recognize the importance of proper maintenance. The course explains crane capacity charts, and the process of calculating safe working loads. The effective use of a uniform set of hand signals is discussed, and standard hand signals are demonstrated for the student by digital video. Crane Safety is a crucial subject for rig personnel, and useful knowledge for anyone concerned with rig operations.



**NORM in the Petroleum Industry** \ This course provides a general understanding of Naturally Occurring Radioactive Materials (NORM) in the petroleum industry. The origins of NORM in reservoir formations and the process whereby they are produced at the well site are shown and NORM contamination in oil and gas production facilities is explained. The course also discusses radium contamination of scale and sludge and radon contamination in natural gas facilities. NORM contamination is so widespread in the petroleum industry that all personnel need to be informed of the potential hazards of NORM exposure.



**H2s Safety in Production Operations** \ H2S Safety in Production Operations instructs operations personnel on the characteristics of Hydrogen Sulfide (H2S) and its effects on those exposed to it and its impact on material and equipment. The dangers of sulfur dioxide gas (SO2), a by-product of H2S, are also discussed. Proper use of H2S safety equipment, including various types of H2S monitors, is covered in detail. By using the audio in the module, the student is taught to recognize warning alarms made by standard H2S detection equipment.



**Hazwoper** \ This safety analysis is for employers, foremen, and supervisors, but employees are encouraged to use the information as well to analyze their own jobs and recognize workplace hazards so they can report them to you. It explains what a job hazard analysis is and offers guidelines to help you conduct your own step-by-step analysis.

## Drilling Fundamentals



**Kick Detection** \ Kick Detection trains the student to detect drilling kicks as early as possible. This course illustrates the significance of formation porosity and permeability in the development of a drilling kick. It also shows the role of the mud column in holding back the kick. Several early warning signs are explained such as: mud returns cut with oil, water or gas; drilling break; pit gain; change in rate of mud return; decrease in mud pump discharge pressure; increase in drill string weight; and unaccounted-for fluid gain or loss while tripping. The lesson concludes with the proper actions that must be taken to assure early kick detection. These include noting changes made to pit volumes, maintaining trip sheets, using the trip tank.



**Oilwell Drilling \** Oilwell Drilling introduces the techniques and technologies involved in drilling oil wells. The course is intended for personnel new to the oil and gas industry, specifically including those in the administrative and support services as well as those in the field. Oilwell Drilling provides a firm foundation knowledge of oilfield practices and terminology that can prove invaluable in every sector of the industry. This course comprises ten computer-based training modules, each representing two hours of instruction and exercises.



**Primary Cementing \** Primary Cementing reviews the objectives of cementing an open hole. The student learns the characteristics of an ideal cementable wellbore, and how best to achieve them. The course then describes the procedures used to condition the mud prior to cementing the wellbore, including specific additives for different configurations. Furthermore, it explains the key to attaining complete mud displacement during the cementing job and how this positively influences the success of the completion.



**Underbalanced Drilling \** The first volume on Underbalanced Drilling (UBD) and Completions provides the student with an overview of the specialized technology and operations used in this critical oilfield discipline. The reasons why UBD techniques are employed are presented in a straightforward manner along with a discussion of advantages and concerns. The student will become familiar with the mechanical equipment used in UBD operations as well as the different types of UBD and their specific field application.



**Well Control Fundamentals \** Well Control Fundamentals introduces drilling professionals to the basic concepts and procedures for maintaining and regaining control of a well during drilling operations. This course begins by describing the various types of fluid pressures in a well and how they relate to depth, density and pipe length. Example calculations are provided to illustrate the mathematical inter-relationships between the parameters. A presentation of how these pressures exist and react at various points in the borehole and formation follows this introduction. Hydrostatic, friction, formation, surface, bottomhole, trapped, fracture/leak off and drill pipe pressures are all covered, as well as pressure gradients and the U-Tube principle. Following this overview on basic pressure behavior in the drilling process, procedures for regaining control of a well that has taken a kick are then discussed in detail. High-end graphics and animations walk the student in step-by-step fashion through the Driller's and Wait-and-Weight Methods of well control. Interactive worksheets for both methods are provided and explained through the use of easy-to-understand terminology and real-world examples. The two methods are then compared to illustrate their advantages and disadvantages. The use of media-rich material and high-impact visuals throughout the course help to clarify and reinforce complex subject material. Quizzes are introduced at key points in the modules to reinforce the users understanding of learning objectives.



**Introduction to Well Control \** The premise of Introduction to Well Control computer based training course is that every member of the rig crew should understand the fundamental principles of well control in order to obtain the highest degree of safety during drilling operations. This self-paced interactive multimedia program takes a rig hand through the basic concepts of well control in an easy to understand, straight-forward manner. 3D animations, graphics and other visual imagery are used to quickly communicate complex subject material to manpower with diverse technical backgrounds and language skills.

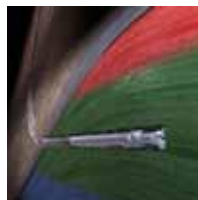
# INTRODUCTION TO PETROLEUM INDUSTRY: DRILLING OPERATIONS FOCUS (DIT)

LENGTH: 68 Hours CEU: 6.8 Credits LANGUAGES: EN



## OVERVIEW

This unique program will teach you the knowledge and skills you need to be hired as an-entry level worker in Drilling Operations and related oil and gas positions. You will learn about the basic principles underlying all work in the oil and gas industry, with a focus on Drilling Operation practices and processes, and important related concepts. Upon successful completion you will receive a certificate\* endorsed by the International Association of Drilling Contractors.



## MODULE DESCRIPTIONS



**Basic Principles of Petroleum** \ This course is designed for students who require a basic understanding of the petroleum industry to perform their jobs. It provides an easy-to-understand introduction to the basics of upstream and downstream activities. Students will learn how hydrocarbon deposits are formed, explored for, and produced. Students also learn how crude oil and gas are converted from a raw material into a finished product and delivered to markets, or traded worldwide as a commodity.



**Kick Detection** \ Kick Detection trains the student to detect drilling kicks as early as possible. This course illustrates the significance of formation porosity and permeability in the development of a drilling kick. It also shows the role of the mud column in holding back the kick. Several early warning signs are explained such as: mud returns cut with oil, water or gas; drilling break; pit gain; change in rate of mud return; decrease in mud pump discharge pressure; increase in drill string weight; and unaccounted-for fluid gain or loss while tripping. The lesson concludes with the proper actions that must be taken to assure early kick detection. These include noting changes made to pit volumes, maintaining trip sheets, and using the trip tank.



**Oilwell Drilling** \ Oilwell Drilling introduces techniques and technologies involved in drilling oil wells. The course is intended for personnel new to the oil and gas industry, specifically including those in the administrative and support services as well as those in the field. Oilwell Drilling provides a firm foundation knowledge of oilfield practices and terminology that can prove to be invaluable in every sector of the industry. This course is comprised of ten computer-based training modules, each representing two hours of instruction and exercises.



**Primary Cementing** \ Primary Cementing reviews the objectives of cementing an open hole. The student learns the characteristics of an ideal cementable wellbore, and how best to achieve them. The course then describes the procedures used to condition the mud prior to cementing the wellbore, including specific additives for different configurations. Furthermore, it explains the key to attaining complete mud displacement during the cementing job, and how this positively influences the success of the completion.



**Underbalanced Drilling** \ The first volume on Underbalanced Drilling (UBD) and Completions provides the student with an overview of the specialized technology and operations used in this critical oilfield discipline. The reasons why UBD techniques are employed are presented in a straightforward manner along with a discussion of advantages and concerns. The student will become familiar with the mechanical equipment used in UBD operations as well as the different types of UBD and their specific field application.



**Well Control Fundamentals** \ Well Control Fundamentals introduces drilling professionals to the basic concepts and procedures for maintaining and regaining control of a well during drilling operations. This course begins by describing the various types of fluid pressures in a well and how they relate to depth, density and pipe length.

Example calculations are provided to illustrate the mathematical inter-relationships between the parameters. A presentation of how these pressures exist and react at various points in the borehole and formation follows this introduction. Hydrostatic, friction, formation, surface, bottomhole, trapped, fracture/leak off and drill pipe pressures are all covered, as well as pressure gradients and the U-Tube principle. Following this overview on basic pressure behavior in the drilling process, procedures for regaining control of a well that has taken a kick are then discussed in detail. High-end graphics and animations walk the student step-by-step through the Driller's and Wait-and-Weight Methods of well control. Interactive worksheets for both methods are provided and explained through the use of easy-to-understand terminology and real-world examples. The two methods are then compared to illustrate their advantages and disadvantages. The use of media-rich material and high-impact visuals throughout the course help to clarify and reinforce complex subject material. Quizzes are introduced at key points in the modules to reinforce the users understanding of the learning objectives.



**Introduction to Well Control** \ The premise of Introduction to Well Control computer based training course is that every member of the rig crew should understand the fundamental principles of well control in order to obtain the highest degree of safety during drilling operations. This self-paced interactive multimedia program takes a rig hand through the basic concepts of well control in an easy to understand, straight-forward manner. 3D animations, graphics and other visual imagery are used to quickly communicate complex subject material to manpower with diverse technical backgrounds and language skills.



**Bit Hydraulics** \ Bit Hydraulics explains the interaction of hydraulics with other drilling and mud parameters, for an understanding of overall drilling efficiency. This course includes complete references of graphs, tables, equations, and rules for hydraulic calculations. Example problems walk the student through total hydraulic design, from liner size selection to actual jet sizing. An interactive “what if?” exercise permits the student to observe the effects of individual properties on bit hydraulic horsepower. Although aimed primarily at tri-cone bit hydraulics, a section on PDC and diamond bits is also included.



**Horizontal Drilling** \ Horizontal Drilling introduces basic concepts and principles of horizontal well drilling. The course provides complete and clear explanations of why horizontal wells are drilled—from their use in connecting vertical fracture systems for increasing productivity to the control of water and gas coning in problem fields.

The three basic types of horizontal wells (short, medium, and long radius) are depicted utilizing detailed graphics. These preliminary topics are followed by a unit devoted to the mechanics of drilling and completing a horizontal well. Angle-build and angle-hold assemblies for the different types of horizontal wells are presented, as well as animated depictions of steerable assemblies, conventional directional drilling, and short-radius drilling equipment. Informative discussions cover MWDs, top drives, and mud motors in horizontal well drilling operations

# INTRODUCTION TO PETROLEUM INDUSTRY: PRODUCTION OPERATIONS FOCUS (DIT)

LENGTH: 54 Hours CEU: 5.4 Credits LANGUAGES: EN



## OVERVIEW

This unique program will teach you the knowledge and skills you need to be hired as an-entry level worker in Production Operations and related oil and gas positions. You will learn about the basic principles underlying all work in the oil and gas industry, with a focus on the Production Operation practices and processes, and important related concepts. Upon successful completion you will receive a certificate\* endorsed by the International Association of Drilling Contractors.



## UNIT DESCRIPTIONS



**Basic Principles of Petroleum** \ This course is designed for students who require a basic understanding of the petroleum industry to perform their jobs. It provides an easy-to-understand introduction to the basics of upstream and downstream activities. Students will learn how hydrocarbon deposits are formed, explored for, and produced. Students also learn how crude oil and gas are converted from a raw material into a finished product and delivered to markets, or traded worldwide as a commodity.



**Artificial Lift** \ Artificial Lift introduces the techniques and technologies involved in artificial lift, with specific attention to sucker rod pumping, gas lift, and electric submersible pumps. The course provides a useful knowledge foundation to professionals in every sector of the industry, and of immediate value to field personnel. Each functional component of the sucker-rod pumping system is presented, and the major geometries of pumping units are defined with respect to their specific application and utilization. The operation of three different gas lift configurations is described. Detailed graphics illustrate the basic components and operation of electric submersible pumps. The relative advantages and disadvantages of each artificial lift method are compared and discussed. This course comprises six computer-based training modules, each one representing over an hour and a half of instruction and exercises.



**Oilfield Metering Primer** \ This primer on Oilfield Metering reviews the methods used to measure fluid volumes in the oilfield for accurate accounting, process monitoring, and custody transfer. Liquid metering techniques are discussed first, followed by gas metering. The first part of the course concerns methods of liquid metering. Positive displacement, turbine, vane, paddle, orifice, and vortex meters are described. Maintenance, wear, and the effects of gas and solids in the liquid stream are reviewed. The second part of the course concerns methods of gas measurement. The unit describes orifice metering equipment in detail, and emphasizes the importance of maintenance and inspection. Methods of recording accurate measurements are reviewed, and the equations for calculating gas volumes are explained.



**Perforating Fundamentals** \ This course on Perforating Fundamentals explains the basic concepts of perforating, including safety around explosives and the potential consequences of mistakes. It reviews topics related to shaped charges, including their design, completion, and detonation, as well as standoff, interference, and the manufacturing and performance of the shaped charge. The course then introduces perforating guns, including capsule guns, carrier guns, and pivot guns. Debris control and gun size are also discussed, along with tips on how to maximize clearance. The importance of the entrance hole diameter is reviewed. The course describes how perforating guns are run and fired in a well. A full range of firing systems and related equipment are discussed in the context of their field use. The course emphasizes safety procedures that must be followed in the field. It concludes with a review of supplemental equipment and perforating accessories.



**Slickline Operations** \ Slickline Operations introduces the techniques and technologies involved in working with slickline and braided wireline. The course covers wireline jars and jarring operations, surface equipment, basic wireline tools, and applications specific to gas lift operations. Slickline Operations supplies a firm foundation knowledge of the practices and terminology that benefits not only new personnel in the field, but also those in administrative and support roles. This course comprises five computer-based training modules, each representing two hours of instruction and exercises. A reference dictionary of terms and abbreviations common to slickline operations is also included.



**Subsurface Safety Valves** \ This course introduces the purpose, operation, and application of Subsurface Safety Valves. Case studies demonstrate the need for setting the valves at certain depths. Environmental complications encountered in sub-sea installations, arctic conditions, extreme temperatures, and even earthquake-prone regions are covered. Surface and subsurface controlled downhole safety valves are described, accompanied by detailed animations and graphics demonstrating the valves' operation. Students operate a surface control panel and see the effect of each action downhole.



**Surface Facilities Primer** \ The Surface Facilities Primer introduces the equipment typically used to process fluids produced from oil wells, describing the identification, internal configuration, principles of operation, and contribution to the overall system of each of the major pieces of oilfield surface equipment. Emulsion breaking and the separation of oil, gas, and water are discussed. The course also covers the handling, storage, and transportation of hydrocarbons produced from the well. Two subjects in particular are afforded specific attention in this course: One module covers the function and operation of reciprocating compressors. Another provides detailed procedures for coupling alignment. The Surface Facilities Primer course comprises four computer-based training modules, each one representing over an hour and a half of instruction and exercises.



# INTRODUCTION TO WELL CONTROL (IADC WELLCAP)

LENGTH: 14 Hours CEU: 1.4 Credits LANGUAGES: EN/FR/SP/PT/IN/AR



## OVERVIEW

The premise of Introduction to Well Control computer based training course is that every member of the rig crew should understand the fundamental principles of well control in order to obtain the highest degree of safety during drilling operations. This self-paced interactive multimedia program takes a rig hand through the basic concepts of well control in an easy to understand, straight-forward manner. 3D animations, graphics and other visual imagery are used to quickly communicate complex subject material to manpower with diverse technical backgrounds and language skills.



## MODULE DESCRIPTIONS

**1. Well Control Equipment** \ This module covers why controlling pressure in the well is important, the role of drilling fluid in controlling the well, BOP stacks and how they work, and the function of other equipment used in well control activities. Instrumentation used in well control operations is also discussed.

**2. Units of Measure** \ The second module covers units of measurement used in the oil field, calculating surface area and volume, calculating pressure, and the definition of density and how it is measured.

**3. Hydrostatic Pressure** \ Hydrostatic pressure discusses the linear relationship between depth and pressure, how to calculate it, the importance of true vertical depth(TVD), and how the hydrostatic pressures in different sections of a well add to determine bottom hole pressure.

**4. Pressure Balance** \ Topics covered in this module are how the drill string and annulus can be represented as a U-tube, differences between normal, abnormal and subnormal formation pressures, and balancing formation pressures with hydrostatic pressure of the drilling fluid.

**5. Causes of Kicks** \ In this module, you will learn how to identify the different conditions that can cause a kick, describe how a kick develops, describe the warning signs and the indicators of kicks, and describe the effects of a gas kick.

**6. Controlling the Well** \ This module covers the steps involved in shutting in the well when a kick is detected, how closing in the well can be used to increase bottomhole pressure and stop flow, why responding quickly to a kick is important, and how migrating gas in a shut-in well effects surface and downhole pressures.

**7. Restoring the Well** \ The final module in the IWC series covers the special problems that kicks from shallow formations present, why maintaining constant bottomhole pressure is important when handling a kick, and the steps in two methods used to restore normal circulation.

# IADC RIG PASS (IADC)

LENGTH: 18 Hours CEU: 1.8 Credits LANGUAGES: EN



## OVERVIEW

IADC offers accreditation for Health, Safety & Environmental (HSE) Orientation Programs that meet the criteria established by the Association's Health, Safety & Environment Committee. The key objective of RIG PASS is to provide new employees with a basic orientation of rig operations and safe work practices. Ideally, this should occur before the employee begins work at the rig. However, due to various logistical conditions in the drilling industry, this will not always be possible. Companies with in-house programs are encouraged to establish policies to ensure that their new employees complete the RIG PASS orientation as soon as it is practical.



## MODULE DESCRIPTIONS

**1. General Safety Course** \ In this module we cover the general safety principles, alcohol and drug policies, and many items that are prohibited while in the oil and gas production workplace. Personal conduct is also discussed as well as housekeeping and basic principles of land transportation. We also cover manual and power hand tool safety, walking and working surface safety, and how to report accidents and assist in the investigation of workplace accidents.

**2. Personal Protective Equipment (PPE)** \ Here, we cover general personal protection equipment. The types of equipment covered in this module include head protection, face and eye protection, hearing protection, and foot protection. We also include information on hand, respiratory, and fall protection, as well as other personal protective equipment that is less common in the oil and gas production workplace.

**3. Health and Hazards** \ In this module we cover certain types of hazards that are present in the oil and gas production workplace, as well as the difficulties of transporting hazardous materials. We also cover general health and first aid, and the responsibilities of those in the workplace regarding industrial hygiene, bloodborne pathogens, and planning for emergencies.

**4. Specialized Work Procedures** \ In this module we cover types of hazardous energy, lockout and tagout procedures, and different work permits. We also discuss employee's responsibilities when working in confined spaces, at heights, and while hoisting or lifting objects.

**5. Personal Safety Responsibilities on the Rig** \ In this module we discuss personal fire safety responsibilities and procedures when in the oil and gas production workplace. We also cover crane safety, manual material handling, and water safety and regulations.

**6. Platform Arrival Procedures and Environment Regulations** \ Here, we discuss the policies and procedures for entering the rig environment. We also discuss environmental regulations concerning waste management, reporting waste, and marine debris policies while in the oil and gas production workplace.

**7. Shore Base Arrival** \ In this module we go over the aspects of entering the rig environment, such as safe helicopter and boat transportation. We also discuss swing rope procedures and how to safely use personnel baskets.

**8. Land Certification** \ In this module we cover the role of site workers, their personal protective equipment, and rescue procedures. We also discuss the hazards and safety regulations concerning pits, ponds, trenching, and shoring.

**9. Safety and Environmental Management System (SEMS) Awareness** \ In this module we introduce Safety and Environment Management Systems (SEMS). This module spreads awareness of SEMS regulations, the 13 elements of SEMS, and responsibilities required by SEMS for operators, contractors, and workers.

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# DRILLING FUNDAMENTALS

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The Drilling Fundamentals Library details the processes and tools used to drill a well, as well as key concepts like kick detection, underbalanced drilling, primary cementing and well control. Drilling wells is perhaps the most challenging and dangerous process in oil and gas exploration and production, and is the first step in exploration and production. Specialized procedures, tools, and equipment are required during the process of bringing a well to completion, and knowledge of how these pieces work with each other and their specific role in the creation of a well is essential for efficient and safe drilling operations. Maintaining control of the well during drilling operations is crucial to the safety of crew members, and protection of the environment. The last step of drilling a well is completion, in which specialized casing and cementing operations allow production of well fluids.

# OILWELL DRILLING (OWD)

LENGTH: 20 Hours CEU:2 Credits LANGUAGES: EN/FR/SP/PT/RU/IN/TH/AR

## OVERVIEW

Oilwell Drilling introduces the techniques and technologies involved in drilling oil wells. The course is intended for personnel new to the oil and gas industry, specifically those in the administrative and support services as well as those in the field. Oilwell Drilling provides a firm foundation of knowledge about oilfield practices and terminology that can prove invaluable in every sector of the industry. This course comprises ten computer-based training modules, each representing two hours of instruction and exercises.



## MODULE DESCRIPTIONS

**1: Introduction to Rig Types and Basic Drill String Components** \ The first Oilwell Drilling module covers basic oil and gas well drilling principles. Different types of drilling rigs are presented, the difference between a kelly/rotary table and a top drive system is explained, and the components of a drill string are described in detail.

**2: Basic Blowout Prevention Equipment Components** \ A blowout represents the single most dangerous threat to human life and property during the drilling process. This module explains the causes of a blow-out and covers the tools and methods used to control and prevent drilling kicks.

**3: Introduction to Drilling Fluids** \ Volume 3 concerns the function of drilling fluids in drilling operations. The module covers the physical properties of drilling mud, the advantages of mud additives, and the importance of mud testing. Procedures for drilling with air and foam are also discussed.

**4: Mud Circulation and Treating Equipment** \ Volume 4 presents a comprehensive overview of the mud circulation and conditioning systems on a drilling rig. It follows the flow of mud step-by-step through the system and explains the function of all circulation components.

**5: Hoisting Equipment** \ The purpose and operation of a rig's hoisting system are covered in the fifth Oilwell Drilling module. All important elements are described in detail, from the drawworks to the traveling block.

**6: Rotating Equipment, Mast, and Substructure** \ Volume 6 addresses both the kelly/rotary table and top drive systems, and discusses the advantages of each in various drilling operations. The module also explains the function and characteristics of masts and derricks, and the components of the substructure.

**7: Pipe Handling** \ This module describes the process of tripping pipe and making connections with kelly and top drive rotary systems. It also explains the use of slips and elevators, describes the features of a driller's console, and introduces innovations such as the iron roughneck.

**8: Casing and Cementing** \ Casing and primary cementing operations are covered in the eighth volume of Oilwell Drilling. The module examines the purpose and qualities of basic casing strings and liners, describes casing accessories, and explains the cementing procedure from start to finish.

**9: Well Logging, Mud Logging, and Drill Stem Testing** \ Volume 9 explains the need for careful testing to determine the commercial potential of a well prior to completion. Methods and tools for mud logging, well logging, and drill stem testing are described in detail.

**10: Power Systems and Instrumentation** \ The various types of power systems found on the rig are presented in this module: AC to DC, DC to DC, mechanical, hydraulic, and pneumatic drive systems. The module emphasizes the importance of prime movers and concludes with a review of rig instrumentation.

## BIT HYDRAULICS (BIT)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN/PT

### OVERVIEW

Bit Hydraulics explains the interaction of hydraulics with other drilling and mud parameters, for an understanding of overall drilling efficiency. This course include complete references of graphs, tables, equations, and rules for hydraulic calculations. Example problems walk the student through total hydraulic design, from liner size selection to actual jet sizing. An interactive “what if?” exercise permits the student to observe the effects of individual properties on bit hydraulic horsepower. Although aimed primarily at tri-cone bit hydraulics, a section on PDC and diamond bits is also included.



### MODULE DESCRIPTIONS

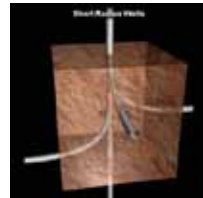
- \ Explain terms and equations used in hydraulics.
- \ Describe the effect of hydraulics on rate of penetration.
- \ Explain optimum hydraulic horsepower and impact force.
- \ Calculate optimum jet sizes (based on both theoretical and actual field data).

## HORIZONTAL DRILLING (HDRLG)

LENGTH: 4 Hours CEU:0.4 Credits LANGUAGES: EN/PT

### OVERVIEW

Horizontal Drilling introduces the basic concepts and principles of horizontal well drilling. The course provides complete and clear explanations of why horizontal wells are drilled—from their use in connecting vertical fracture systems for increasing productivity to the control of water and gas coning in problem fields. The three basic types of horizontal wells (short, medium, and long radius) are depicted utilizing detailed graphics. These preliminary topics are followed by a unit devoted to the mechanics of drilling and completing a horizontal well. Angle-build and angle-hold assemblies for the different types of horizontal wells are presented, as well as animated depictions of steerable assemblies, conventional directional drilling, and short-radius drilling equipment. Informative discussions cover MWDS, top drives, and mud motors in horizontal well drilling operations



### MODULE DESCRIPTIONS

- 1. Introduction to Horizontal Drilling, Volume 1** \ The first horizontal drilling module covers basic history, technologies, and reasons for drilling horizontal wells. Also covered in this module are topics relating to production rate, economics of horizontal drilling, types of horizontal wells, completion options, equipment, and the steps leading up to production
- 2. Horizontal Drilling, Volume 2** \ This module continues where the introduction left off, covering build curves, kick-off points, build radii, and curve information. The module continues with drilling processes and examples specifically related to horizontal drilling.

# INTRODUCTION TO WELL CONTROL (IWC)

LENGTH: 14 Hours CEU: 1.4 Credits LANGUAGES: EN/FR/SP/PT/IN/AR



## OVERVIEW

The premise of Introduction to Well Control computer based training course is that every member of the rig crew should understand the fundamental principles of well control in order to obtain the highest degree of safety during drilling operations. This self-paced interactive multimedia program takes a rig hand through the basic concepts of well control in an easy to understand, straight-forward manner. 3D animations, graphics and other visual imagery are used to quickly communicate complex subject material to manpower with diverse technical backgrounds and language skills.



## MODULE DESCRIPTIONS

**1. Well Control Equipment** \ This module covers why controlling pressure in the well is important, the role of drilling fluid in controlling the well, BOP stacks and how they work, and the function of other equipment used in well control activities. Instrumentation used in well control operations is also discussed.

**2. Units of Measure** \ The second module covers units of measurement used in the oil field, calculating surface area and volume, calculating pressure, and the definition of density and how it is measured.

**3. Hydrostatic Pressure** \ Hydrostatic pressure discusses the linear relationship between depth and pressure, how to calculate it, the importance of true vertical depth(TVD), and how the hydrostatic pressures in different sections of a well add to determine bottom hole pressure.

**4. Pressure Balance** \ Topics covered in this module are how the drill string and annulus can be represented as a U-tube, differences between normal, abnormal and subnormal formation pressures, and balancing formation pressures with hydrostatic pressure of the drilling fluid.

**5. Causes of Kicks** \ In this module, you will learn how to identify the different conditions that can cause a kick, describe how a kick develops, describe the warning signs and the indicators of kicks, and describe the effects of a gas kick.

**6. Controlling the Well** \ This module covers the steps involved in shutting in the well when a kick is detected, how closing in the well can be used to increase bottomhole pressure and stop flow, why responding quickly to a kick is important, and how migrating gas in a shut-in well effects surface and downhole pressures.

**7. Restoring the Well** \ The final module in the IWC series covers the special problems that kicks from shallow formations present, why maintaining constant bottomhole pressure is important when handling a kick, and the steps in two methods used to restore normal circulation.

## KICK DETECTION (KIKDET)

LENGTH: 2 Hours CEU:0.2 Credits LANGUAGES: EN/PT

### OVERVIEW

Kick Detection trains the student to detect drilling kicks as early as possible. This course illustrates the significance of formation porosity and permeability in the development of a drilling kick. It also shows the role of the mud column in holding back the kick. Several early warning signs are explained such as: mud returns cut with oil, water or gas; drilling break; pit gain; change in rate of mud return; decrease in mud pump discharge pressure; increase in drill string weight; and unaccounted-for fluid gain or loss while tripping. The lesson concludes with the proper actions that must be taken to assure early kick detection. These include noting changes made to pit volumes, maintaining trip sheets, using the trip tank, investigating signs of a possible kick, responding to alarms, and proper maintenance of PVT equipment.



### MODULE DESCRIPTIONS

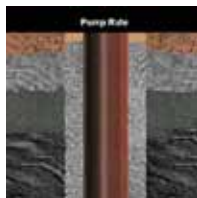
- \ Explain the significance of formation porosity and permeability in the development of kicks.
- \ Explain the role of the mud column in preventing drilling kicks.
- \ Identify early warning signals of kick development which be observed on the rig floor.
- \ List actions the rig crew can take to help assure that kicks are detected early.

## PRIMARY CEMENTING (CEMENT)

LENGTH: 2 Hours CEU:0.2 Credits LANGUAGES: EN/PT

### OVERVIEW

Primary Cementing reviews the objectives of cementing an open hole. The student learns the characteristics of an ideal cementable wellbore, and how best to achieve them. The course then describes the procedures used to condition the mud prior to cementing the wellbore, including specific additives for different configurations. Furthermore, it explains the key to attaining complete mud displacement during the cementing job, and how this positively influences the success of the completion.



### MODULE DESCRIPTIONS

- \ State the objectives of primary cementing.
- \ Describe the operational sequence for primary cementing.
- \ List the requirements of an ideal cementable well bore.
- \ Describe the procedures used to condition the mud prior to primary cementing.
- \ Reference hydraulics tables, graphs, and equations.

## UNDERBALANCED DRILLING (UBD1)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The first volume on Underbalanced Drilling (UBD) and Completions provides the student with an overview of the specialized technology and operations used in this critical oilfield discipline. The reasons why UBD techniques are employed are presented in a straightforward manner along with a discussion of advantages and concerns. The student will become familiar with the mechanical equipment used in UBD operations as well as the different types of UBD and their specific field application.



### MODULE DESCRIPTIONS

- \ Basic Concept and History
- \ Mechanical Equipment used in UBD
- \ Advantages of UBD Operations
- \ Concerns of UBD Operations
- \ Gasified Liquid Drilling
- \ Foam Drilling
- \ Underbalanced Completions

## WELL CONTROL FUNDAMENTALS (WCF)

LENGTH: 8 Hours CEU: 0.8 LANGUAGES: EN/SP/PT/RU/IN/AR

### OVERVIEW

Well Control Fundamentals introduces drilling professionals to the basic concepts and procedures for maintaining and regaining control of a well during drilling operations. This course begins by describing the various types of fluid pressures in a well and how they relate to depth, density and pipe length. Example calculations are provided to illustrate the mathematical inter-relationships between the parameters. A presentation of how these pressures exist and react at various points in the borehole and formation follows this introduction. Hydrostatic, friction, formation, surface, bottomhole, trapped, fracture/leak off and drill pipe pressures are all covered, as well as pressure gradients and the U-Tube principle. Following this overview on basic pressure behavior in the drilling process, procedures for regaining control of a well that has taken a kick are then discussed in detail. High-end graphics and animations walk the student in step-by-step fashion through the Driller's and Wait-and-Weight Methods of well control. Interactive worksheets for both methods are provided and explained through the use of easy-to-understand terminology and real-world examples. The two methods are then compared to illustrate their advantages and disadvantages. The use of media-rich material and high-impact visuals throughout the course help to clarify and reinforce complex subject material. Quizzes are introduced at key points in the modules to reinforce the users understanding of learning objectives.



### MODULE DESCRIPTIONS

**1. Basic Concepts of Pressure** \ Module 1 discusses the various pressures that are important in a course on well control. The module details the origins of these pressures and helps in understanding how these different pressures affect and interact with one another. This module also instructs on how to calculate and interpret pressure data.

**2. Pressures in a Well** \ Module 2 demonstrates how to calculate each type of pressure and to understand its significance in well control. The types of pressures covered are formation pressure, surface pressure, bottomhole pressure, trapped pressure, drill pipe pressure, fracture/leak-off pressure, and surge and swab pressure.



**3. The Drillers Well Control Method** \ This module will begin with an overview of the Driller's Method. Next, we'll cover the Driller's Method step-by-step. A specific example of an application of the Driller's Method will be presented. Next, you will learn the two Driller's Method rules, and the Driller's Method Worksheet will be introduced. The module concludes by discussing calculations involving shut-in drill pipe pressure (SIDPP) and shut-in casing pressure (SICP), and an explanation of maximum shoe pressure.

**4. Wait-and-weight Control Method** \ This module begins with a general description of the Wait-and-Weight Method. Next, it covers the Drill Pipe Pressure Profile. The module then takes a detailed look at the Wait-and-Weight Method and discusses the Wait-and-Weight Method worksheet. The module concludes by comparing the advantages and disadvantages of the Driller's Method and the Wait-and-Weight Method.

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## GENERAL PETROLEUM

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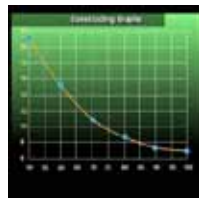
The General Petroleum Library presents students with a clear picture of the most fundamental concepts in the oil and gas industry. Every day millions of barrels of oil are consumed across the world to fuel vehicles and produce many useful products. It is the petroleum industry that brings oil and natural gas out of the ground, turns it into useful products, and distributes these products. To accomplish this, reservoirs are evaluated on the characteristics of a formation and volumetric calculations must be made. On the rig, knowledge of relevant equations and math skills will be required of workers, as they must be comfortable making frequent calculations involving weights, volumes and pressures to work effectively.

## BASIC OILFIELD MATHEMATICS (BOFC)

LENGTH: 4 Hours CEU: 0.4 Credits LANGUAGES: EN

### OVERVIEW

Basic Oilfield Mathematics covers general mathematical calculations likely to be encountered in the oilfield. The course takes a practical approach, featuring numerous examples for tubular weights and volumes, tank capacities, API gravity, downhole static pressure, and unit conversion from one unit to another. It covers basic physics concepts such as density and specific gravity. Effects of well deviation on measurement and pressure calculations is explained. Principles of pressure and force are illustrated. Advanced topics include fluid measurement and orifice metering calculations, and a few exercises in oilfield economics.



### MODULE DESCRIPTIONS

**1. Introduction to General Mathematical Calculations 1** \ Volume 1 of Basic Oilfield Calculations covers topics such as: how to perform unit conversions, calculate the volumes of geometric shapes, including tubular shapes such as pipe and casing, and interpret data presented on a graph.

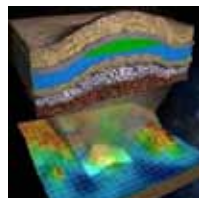
**2. Introduction to General Mathematical Calculations 2** \ Volume 2 of Basic Oilfield Calculations covers topics such as: fluid measurements, calculating density and specific gravity of a liquid or solid, differentiating between specific gravity and API gravity, the effects of downhole static pressure on wireline operations, using tables during acidizing treatments, and calculating the lifting costs, economic limit, and payout.

## BASIC PRINCIPLES OF PETROLEUM (BPP)

LENGTH: 14 Hours CEU: 1.4 Credits LANGUAGES: EN

### OVERVIEW

This course is designed for students who require a basic understanding of the petroleum industry to perform their jobs. It provides an easy-to-understand introduction to the basics of upstream and downstream activities. Students will learn how hydrocarbon deposits are formed, explored for, and produced. Next, students will learn how crude oil and gas are converted from a raw material to a finished product and delivered to markets or traded worldwide as a commodity.



### MODULE DESCRIPTIONS

**1. Geology of Petroleum** \ Module 1 discusses how the physical structure of the earth was formed, what the earth's crust is composed of, how the history of the earth is mapped, which processes are involved in the formation of mountains, why sedimentation occurs, what organic matter is and how oil and gas are formed.

**2. Exploration for Oil and Gas** \ Module 2 discusses the differences between reserves of oil, gas and petroleum as a resource, how a reservoir is formed, what the characteristics of a viable reservoir are, the techniques used to identify potential reservoir formations, the role seismic surveys play in locating potential reservoirs and why exploratory drilling is only used when the potential for a viable reservoir is high.

**3. Drilling Operations Basics** \ Module 3 discusses the nature of drilling operations, the importance of subsurface conditions, why well bores change size, the three stages of drilling, why different drilling methods are used and the significance of well bore control.

**4. Production of Oil and Gas** \ Module 4 discusses the steps involved in preparing a well for production, what natural lift is and the types of natural lift, the principal types of artificial lift, the types of well completions, what is involved in well servicing and how oil and gas are treated on emerging from the well.

**5. Petroleum Refining Process** \ Module 5 discusses which molecules make up the different types of hydrocarbons, how contaminants in the oil are dealt with, why boiling points are important to the refining process, where refineries are located, what the two basic areas of a refinery are, what happens during the two main stages of refining, why each upgrading procedure is important and what happens before and after the refining process.

**6. Transportation, Distribution and Delivery of Oil and Gas** \ Module 6 discusses why two basic transportation streams are used, how natural gas is transported, distributed and delivered, how crude oil is also transported, distributed and delivered, where refineries are located, how bulk and finished refined products reach their consumers and how using oil and gas affects the environment as well as the industry.

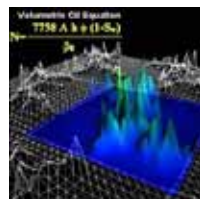
**7. Marketing Petroleum Products** \ Module 7 discusses what the three marketing sectors of petroleum are, which forces control the nature of the petroleum market, where the major producers and major consumers are located, how crude oil is traded, how the supply and demand of petroleum is stabilized and how refined petroleum products are marketed.

## RESERVOIR ENGINEERING PRIMER (RESVOL)

LENGTH: 4 Hours CEU: 0.4 Credits LANGUAGES: EN

### OVERVIEW

This Reservoir Engineering Primer is divided into two computer-based training modules. The first part of the course aims to provide a general understanding of oil and gas reservoirs. The course explains the geologic processes of reservoir formation, then examines the origins of oil and gas. The characteristics of a reservoir and their contributions to reservoir quality described in detail. The second module presents practical reservoir engineering techniques for calculating the original oil-in-place and gas-in-place in a reservoir. The student learns methods of determining each of the parameters used in the reservoir volumetric equation: area, net pay, porosity, and water saturation. Isopach mapping and contouring are also demonstrated. The reservoir is so fundamental to the petroleum business that the information included in this course is immediately relevant to everyone associated with the industry.



### MODULE DESCRIPTIONS

**1. Reservoir Engineering Primer** \ Module 1, Reservoir Engineering Primer, covers variables in volumetric equations, calculating original oil in place and calculating original gas in place.

**2. Oil and Gas Reservoirs** \ Module 2 of the Reservoir Engineering Primer Series, Oil and Gas Reservoirs, explains how oil and gas reservoirs are created and where they are likely to be found, and, reservoir characteristics and how they affect production operations.

## WIRESLINE OPERATIONS (WLN1)

LENGTH: 14 Hours CEU: 1.4 Credits LANGUAGES: EN

### OVERVIEW

Wireline Logging operations involve a wide range of technical disciplines, from nuclear physics to petroleum geology. This introductory course addresses many of the most complex techniques used in oilfield drilling and explains the purpose and value of these techniques. These explanations promote a deeper understanding of the material, and enhance overall course quality.

This course will show how Wireline Logging developed and discusses the tools and technologies that are used by engineers worldwide. This course includes a discussion of proper tool handling techniques to help promote safety awareness among the students and others working around them, leading to a more productive and profitable work place. Building student confidence will have an immediate impact in improved handling of tools and worker safety.



## GEOLOGY AND FORMATION EVALUATION (WLN1A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The first Wireline course module provides insight into the basics of reservoir geology: defining a formation and how they are evaluated. Because it is important to understand how hydrocarbon reservoirs are formed, the fundamentals of deposition, lithification, and organic thermal maturation, and trapping are explained. The basics of surface reflection seismic testing and how it can be used to evaluate a potential reservoir is described. Finally, the role of wireline logging tools in the evaluation of hydrocarbon traps and in helping operating companies decide their next move is discussed.

### MODULE OBJECTIVES

- \ What formations are and how they are formed
- \ How hydrocarbons are formed
- \ How hydrocarbons become trapped in a formation
- \ Formation evaluation and how it can help recover hydrocarbons
- \ Why evaluation is important and how it impacts drilling operations

## WHAT IS WIRESLINE LOGGING (WLN1B\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

This second Wireline module introduces well logging, what it is used for, and summarizes the history of wireline logging, including the development of significant tool and wellsite operational and recording technologies. The primary applications of wireline logging are described and wireline operational modes, i.e., electric line and slickline, are discussed. Formation evaluation is defined, and how formations can be examined to help determine their commercial potential is explained. This module shows what can be achieved through use of wireline logging..

### MODULE OBJECTIVES

- \ Define and describe Wireline Logging
- \ Present a brief history of wireline logging
- \ Describe the different types of wireline logging and their uses
- \ Describe formation evaluation and its importance

## OPENHOLE TOOLS AND FORMATION EVALUATION (WLN1C\_0)

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this module, the importance of formation evaluation is examined. The module explores the different critical rock properties provided by different wireline tools, e.g., resistivity and porosity, along with a brief description of the tool principles used to make the measurements. Most importantly, the module describes the importance of this information for allowing engineers to determine whether a well can be produced profitably. In addition to conventional resistivity, acoustic and nuclear porosity, and gamma-ray logging tools, NMR and borehole imaging tools are covered. The importance of data obtained by wireline core and fluid sampling tools is also emphasized.

### MODULE OBJECTIVES

- \ How formations are evaluated using openhole wireline tools
- \ How each type of wireline tool measures formation properties
- \ How each tool provides different and critical information

## CASED HOLE (WLN1D\_0)

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The fourth module describes casing a well and the roles of different cased-hole wireline logging tools, such as, cement and casing integrity and production monitoring, and the principles behind the tool measurements. These measurements are essential for avoiding costly production problems. However, if such problems do occur during completion or production, specialized wireline tools are used in well intervention and recompletion activities to return the well to optimal production. Specialized cased-hole logging tools used for formation evaluation are discussed. Some of the sophisticated software tools needed to interpret the data acquired by many cased-hole logging tools explained. These software tools can create interpretative models and also help develop intervention programs that address production issues.

### MODULE OBJECTIVES

- \ What a cased hole tool is
- \ The types of cased-hole tools
- \ What cased-hole tools are used for

## WIRELINE EQUIPMENT AND WELL INTERVENTION (WLN1E\_0)

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The fifth wireline module teaches operational procedures for running wireline logging devices, including how to attach and check that logging tools are properly attached to the wireline, and operating the winch. Proper understanding of the concept of 'weakpoint' can not only save logging tools, but also avoid potential financial penalties. In regards to cased-hole intervention logging, two of the most widely used wireline hydraulic systems are described. Maintaining proper wellhead pressure control, via use of a "Christmas Tree" and a BOP stack, and the importance of maintaining proper grease pressure during wireline intervention are also explained.

### **MODULE OBJECTIVES**

- \ Attachment of tools to the wireline
- \ Lowering tools into the hole on a wireline
- \ Hydraulic systems
- \ Well Intervention Equipment

## **TOOL SAFETY (WLN1F\_0)**

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### **OVERVIEW**

The sixth module covers basic wireline tool safety—Nothing is more important when working on a rig than safety. Awareness is the key to avoiding incident or injury. This module stresses the importance of good communication and double checking procedures. The reasons behind the separate sets of stringent rules governing radioactive and explosive tools are explained. Common rigsite risks and dangers that can accompany wireline logging operations, such as static electricity, high pressures associated with fluid and pressure testing tools, and the extreme danger of H<sub>2</sub>S gas are explained, and how following simple safety steps can save lives.

### **MODULE OBJECTIVES**

- \ Basic wireline tool safety
- \ Specific safety procedures associated with hazardous tools
- \ Pressure control when operating a wireline

## **COLLABORATIVE DATA AND OILFIELD MODELING (WLN1G\_0)**

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### **OVERVIEW**

This last module in the Wireline Operations course is a culmination of what has been learned so far, namely, the central role and importance of data obtained through wireline operations in oilfield development. This includes a description of how computer models representing the geology of an entire field can be developed from the combination of surface seismic data and wireline data from just a few boreholes. Also, how computer reservoir simulations using predictive applications are run to predict reservoir performance for the entire field. These simulations substantially increase overall savings, while reducing the time needed to develop the field and eliminating unnecessary equipment and injuries to personnel.

### **MODULE OBJECTIVES**

- \ Wireline's role in oilfield development
- \ Computer modeling
- \ The importance of predictive modeling and simulation

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## HEALTH, SAFETY AND ENVIRONMENT

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Health, Safety and Environment (HSE) topics are presented in PetroEd's HSE Library, which addresses safe work practices on a rig or platform. Cranes are used everyday on offshore platforms, which makes working safely with and around cranes important for crane operators and rig personnel. H<sub>2</sub>S is commonly associated with decaying organic matter, and can be produced during rig operations. It is important for all rig workers to be familiar with characteristics, safety equipment, and treatment in the event of a H<sub>2</sub>S leak. Radioactive materials are another concern for petroleum industry personnel, as production operations can easily become contaminated with NORM, posing health risks for workers. In the event of an accidental oil spill, accurately estimating the volume of oil spilled is vital to reporting and management of accidental release.



## CRANE SAFETY (CRANE)

LENGTH: 4 Hours CEU: 0.4 Credits LANGUAGES: EN/FR/SP/PT/IN/AR

### OVERVIEW

Crane Safety tackles the broad subject of offshore pedestal cranes and their safe operation. Students learn to identify the key components of cranes, and to recognize the importance of proper maintenance. The course explains crane capacity charts, and the process of calculating safe working loads. The effective use of a uniform set of hand signals is discussed, and standard hand signals are demonstrated for the student by digital video. Crane Safety is a crucial subject for rig personnel, and useful knowledge for anyone concerned with rig operations.



### MODULE DESCRIPTIONS

**1. An Introduction to Offshore Pedestal Cranes and their Safe Operation 1** \ Module 1 explains how to identify the components of a crane, distinguish between lattice, box, and telescoping booms, review of basic crane maintenance requirements, and the qualifications and duties required of a crane operator.

**2. An Introduction to Offshore Pedestal Cranes and their Safe Operation 2** \ The second module discusses communication using standard hand signals, standard procedures to be followed before, during, and after a lifting operation, and calculating a safe working load using capacity charts.

## H2S SAFETY IN PRODUCTION OPERATIONS (H2S)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

H2S Safety in Production Operations instructs operations personnel in the characteristics of Hydrogen Sulfide (H2S) and its effects on those exposed to it and its impact on material and equipment. The dangers of sulfur dioxide gas (SO2), a by-product of H2S, are also discussed. Proper use of H2S safety equipment, including various types of H2S monitors, is covered in detail. By using the audio in the module, the student is taught to recognize warning alarms made by standard H2S detection equipment. Proper escape and rescue procedures in the event of an H2S leak are discussed and a step-by-step discussion of emergency treatment.



### MODULE DESCRIPTIONS

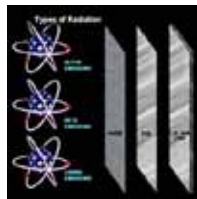
- \ Describe the characteristics and effects of hydrogen sulfide.
- \ List hydrogen sulfide safety practices and emergency procedures.

## NORM IN THE PETROLEUM INDUSTRY (NORM)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN/FR/SP/PT/RU/IN/TH/AR

### OVERVIEW

This course provides a general understanding of Naturally Occurring Radioactive Materials (NORM) in the petroleum industry. Because NORM contamination is so widespread in the petroleum industry, all personnel should be informed of the potential hazards associated with NORM exposure. The course examines the origins of NORM in reservoir formations and the processes whereby these materials are produced at the wellsite. The course explains NORM contamination in oil and gas production facilities as well as radon contamination in natural gas facilities. Animated graphics of the depositional processes help students visualize the sequence of events.



### MODULE DESCRIPTIONS

- \ Define radiation and radioactivity.
- \ Describe the occurrence and characteristics of NORM in the petroleum industry.
- \ Identify radium and radon hazard areas in petroleum facilities.
- \ List NORM safety procedures.
- \ Explain the proper handling and disposal of NORM waste.

## OILSPILL VOLUME ESTIMATION (OSVET)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Oil Spill Volume Estimation introduces techniques for estimating the volume of an accidental oil spill. Determining the volume of accidental hydrocarbon discharge is rapidly becoming one of the most important aspects of maintaining an environmentally sound offshore production operation. Reporting the amount of accidentally-released oil in the environment during day-to-day operations (a legal requirement in most countries) has proven to be a major problem due to the non-intuitive manner in which hydrocarbons disperse over a body of water. The photographs used in this module are part of the comprehensive archives of the International Tanker Owners Pollution Federation (ITOPF) in London, and have been carefully categorized by the volume per unit area they represent. A systematic method of estimating the size of a spill is presented here in a clear, step-by-step set of procedures that can be used by field operators with no previous experience. A working knowledge of these techniques is also valuable for personnel in administrative and support roles, who may have to deal indirectly with the consequences of an accidental oil spill.



### MODULE DESCRIPTIONS

- \ Approximate the spill volume per unit area by the color of the oil in the water.
- \ Estimate the elliptical surface area of an oil spill with reference to a fixed structure, moving vessel, or helicopter fly over.
- \ Calculate the total volume of an oil spill.

## CORROSION IN THE UNITED STATES (NACE\_1)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

This module discusses corrosion across the United States, including inventory of corroded material and the call for a national survey for corrosion from the US Congress. This introductory module details the results of the Corrosion Costs and Preventative Strategies in the United States Report as well as the range of corrosion across the United States, money spent on corrosion each year, and suggested corrosion mitigating strategies.



### MODULE OBJECTIVES

- \ Review the findings, results and suggested actions of the 2002 Corrosion Report
- \ Understand the range of corrosion across the United States
- \ Understand the approximate costs of corrosion in the United States

## FUNDAMENTALS OF CORROSION (NACE\_2)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

This module discusses the fundamentals of corrosion and the science behind it. Basic principles of chemistry and physics, such as atomic theory and molecular bonding, are introduced in an effort to explain the science behind the corrosion cell, which is paramount to understanding corrosion. Also discussed is the prevention of fatal disasters caused by corrosion.



### MODULE OBJECTIVES

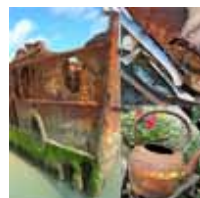
- \ Achieve a basic understanding of the fundamentals of corrosion
- \ Achieve a basic understanding of Atomic theory
- \ Achieve a basic understanding of molecular bonds
- \ Achieve a basic understanding of the corrosion cell

## ENVIRONMENTS OF CORROSION (NACE\_3)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

Corrosion rates vary depending on the material and environments. Environments with Corrosion provides an understanding of how materials interact with atmospheric, subterranean, and aqueous environments. The interaction of these environments with material, and the corresponding effects on corrosion rates is also investigated.



### MODULE OBJECTIVES

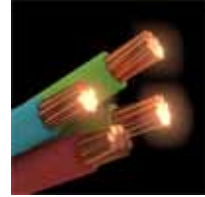
- \ Discuss the different environments in which corrosion occurs
- \ Examine how materials exposed to atmospheric environments experience corrosion
- \ Examine how materials exposed to subterranean environments experience corrosion
- \ Examine how materials exposed to aqueous environments experience corrosion

## ENGINEERING MATERIALS (NACE\_4)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

Engineering materials covers the importance of material selection, specifically, the importance of material selection for engineering projects. Some of the most common building materials, ductile iron, steel, aluminum, concrete and copper, are introduced. The module discusses applications, characteristics and vulnerabilities of each material.



### MODULE OBJECTIVES

- \ Learn how materials are selected for projects
- \ Discuss how ductile iron is used in modern engineering projects
- \ Discuss how aluminum is used in modern engineering projects
- \ Discuss how steel is used in modern engineering projects
- \ Discuss how concrete is used in modern engineering projects
- \ Discuss how copper is used in modern engineering projects

## FORMS OF CORROSION (NACE\_5)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

Forms of corrosion provides an introduction to the variety of corrosion types. General corrosion, localized, pitting, crevice, and intergranular corrosion are a few of the corrosion types discussed. Galvanic, erosion, de-alloying, stress, fatigue, temperature-based corrosion is also covered; as are the effects, causes and solutions to the various forms of corrosion.



### MODULE OBJECTIVES

- \ Discuss general corrosion
- \ Discuss localized, pitting, crevice and intergranular corrosion
- \ Discuss galvanic and concentration cell corrosion; de-alloying corrosion
- \ Discuss stress, fatigue and fretting corrosion
- \ Discuss high temperature, microbial and hydrogen corrosion
- \ Discuss filiform, under insulation and weld decay corrosion

## METHODS OF CORROSION CONTROL (NACE\_6)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

Methods introduces mechanisms for corrosion control. Methods for slowing or preventing corrosion entirely are introduced in this module. Corrosion mitigation techniques discussed include how to approach corrosion mitigation, material selection, environment modification, coating application, and cathodic protection.



### MODULE OBJECTIVES

- \ Understanding how to approach corrosion mitigation
- \ Look at how corrosion can be prevented through material selection
- \ Look at how corrosion can be prevented through environmental modification
- \ Look at how corrosion can be prevented with coatings
- \ Understand how cathodic protection can be used to prevent corrosion

## ECONOMICS OF WATER CORROSION (NACE\_7)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

This module discusses the economics of water corrosion, and introduces the challenges corrosion presents to the water and wastewater sector. Detailed investigations cover the costs of water corrosion in pipes, storage tanks, reservoirs, and the impacts of wastewater corrosion.



### MODULE OBJECTIVES

- \ Gain a basic understanding of the costs associated with water corrosion
- \ Gain a basic understanding of the impact of wastewater corrosion
- \ Examine the economics of water corrosion

## WATER AND WASTEWATER CORROSION (NACE\_8)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

This module illustrates the physical and chemical properties that cause water and soil to act as corrosive agents. Water and wastewater are covered separately within the module, and the most common forms of corrosion seen in industry involving water and wastewater are examined. The physical and chemical properties contributing to corrosive action are introduced, and the factors and mechanisms that accelerate corrosion are also discussed.



### MODULE OBJECTIVES

- \ Discuss the types of corrosion encountered in the water and wastewater industries
- \ Examine the scientific principles behind water corrosion
- \ Examine the mechanisms that accelerate water corrosion

## WATER AND WASTEWATER ENVIRONMENTS (NACE\_9)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

This module looks at three environments in which water-based corrosion occurs. How the physical properties of a material and naturally occurring processes affect corrosion rates are discussed in subterranean, aqueous and atmospheric conditions. Water and wastewater systems, such as pipes, pumps and treatment plants, found in each environment, and how those environments act upon the systems, is covered as well. The module also discusses special considerations that are taken into account for systems exposed to more than one environment.



### MODULE OBJECTIVES

- \ Discuss the different environments in which water corrosion occurs
- \ Examine corrosion in water infrastructure subject to atmospheric environments
- \ Examine corrosion in water infrastructure subject to subterranean environments
- \ Examine corrosion in water infrastructure subject to aqueous environments

## MATERIAL SELECTION FOR WATER (NACE\_10)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

The purpose of this module is to introduce material selection and how material selection can reduce corrosion from water in multiple environments. The module covers chemical and physical processes that cause corrosion in water environments, and how different materials affect these processes. Other topics include common materials used to deter corrosion, and the ways in which these materials themselves corrode.



### MODULE OBJECTIVES

- \ Understand how water and wastewater industries select materials
- \ Examine methods for reducing atmospheric, subterranean, and aqueous corrosion

## WATER AND WASTEWATER CORROSION CONTROL (NACE\_11)

LENGTH: 2 Hours      CEU: 0.2 Credits

### OVERVIEW

Corrosion prevention in the water and wastewater sectors is the main topic of this module. An estimated \$39 billion is spent annually as a result of corrosion in these sectors. The methods used to prevent corrosion, including coatings, environmental modification and cathodic protection, are introduced, and material selection is reprised. This module discusses the reasons why preventing corrosion in the water and wastewater industries is beneficial, from cost savings to increased health and reducing wasted water.



### MODULE OBJECTIVES

- \ Understand how to approach water corrosion mitigation
- \ Look at how water corrosion can be prevented through material selection
- \ Look at how water corrosion can be prevented through environmental modification
- \ Look at how water corrosion can be prevented with coatings
- \ Understand how cathodic protection can be used to prevent water corrosion

## GENERAL SAFETY COURSE (RGP1A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In this module we cover the general safety principles, alcohol and drug policies, and many items that are prohibited while in the oil and gas production workplace. Personal conduct is also discussed as well as housekeeping and basic principles of land transportation. We also cover manual and power hand tool safety, walking and working surface safety, and how to report accidents and assist in the investigation of workplace accidents.



### MODULE OBJECTIVES

- \ General Safety Principles/General Worksite Safety
- \ Alcohol and Drug Policies
- \ Firearms, Weapons, and Other Prohibited Items
- \ Personal Conduct
- \ Manual Hand Tool and Power Hand Tool Safety
- \ Housekeeping
- \ Walking and Working Surfaces
- \ Reporting and Investigating Accidents
- \ Land Transportation

## GENERAL SAFETY: PRINCIPLES

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The Principles module covers the basic tenets of safety both on and off the job as well as the importance of adhering to these principles. Topics include common workplace injuries, their impact on employers and workers, and methods of prevention. Compliance with all levels of safety regulations and the benefits of adopting a safety-conscious attitude are also discussed in this module.

## GENERAL SAFETY: ALCOHOL AND DRUG POLICIES

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Both government regulations and corporate policy impose restrictions on the use of drugs and alcohol. These rules, as well as supervisory responsibilities, employee awareness, and the consequences of alcohol and drug use are covered in this module.

## GENERAL SAFETY: FIREARMS WEAPONS AND OTHER PROHIBITED ITEMS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Certain items are prohibited from an Oil or Gas rig, although they may be perfectly legal to possess elsewhere. In this module, items that should never be brought to the rig are described, along with some of the consequences of having these dangerous items in your workplace.

## GENERAL SAFETY: PERSONAL CONDUCT

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Respect for ones coworkers is essential to a safe and productive workplace, this module discusses how one should act in the workplace. Avoiding offensive humor, profanity, and horseplay allows everyone to work with peace of mind in a healthy environment. Recognizing and reporting violence in the workplace as well as proper hygiene are also critical elements of personal conduct addressed in the module.

## GENERAL SAFETY: GENERAL WORKSITE SAFETY

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Recognizing and avoiding the most common hazards is crucial to keeping personnel safe and injury-free. General Worksite Safety covers electrical, mechanical and falling hazards, as well as behavior-based safety. Accident prevention through pre-job planning and work stoppages, along with workers' responsibilities in these situations is included in this module. Site orientations, simultaneous operations, and signs and tags are also covered.

## GENERAL SAFETY: MANUAL HAND TOOL AND POWER HAND TOOL SAFETY

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this module the use of powered and manual tools is discussed. Topics covered include tool safety, equipment inspection, and proper use of tools. Explanations of why not to use a broken, damaged, or the inappropriate tool on any job is also included in the instruction.

## GENERAL SAFETY: HOUSEKEEPING

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

An orderly jobsite benefits all workers involved. This module demonstrates just how important house-keeping procedure and practice is on the rig. Walkway and aisle maintenance combined with storage practices can reduce the amount of slip and trip hazards as well as create a safer rig for everyone. Using warning signs, banners, and physical barriers also helps to prevent injury and is detailed in this module.

## GENERAL SAFETY: WALKING WORKING SURFACES

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

More time is spent using walking and working surfaces than any other part of a rig, and these areas present their own safety hazards. Openings in the floor and walls, ladders and scaffolding, and stairways and handrails all have guidelines governing their use that allow workers to keep themselves safe while walking or working.

## GENERAL SAFETY: ACCIDENT REPORTING AND INVESTIGATING

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Even with the appropriate safety precautions taken, accidents are still possible on the work-site. The Accident Reporting and Investigation unit informs students of the best practices and response procedures to be followed in the aftermath of an accident on the jobsite. Unauthorized or uncontrolled releases as well as related property damage are all covered, as are the purpose and responsibilities associated with accident investigation.

## GENERAL SAFETY: LAND TRANSPORTATION

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Many jobs require employees to travel via car or truck, and there are a number of risks to personnel and material associated with land transportation of this sort. This unit emphasizes the importance of observing local traffic laws and regulations and details best practices for traveling on roads. Students will also become familiar with how to address hazardous conditions, parking, and dangerous behaviors behind the wheel.



## PERSONAL PROTECTIVE EQUIPMENT - PPE (RGP2A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The types of equipment covered in this module include head protection, face and eye protection, hearing protection, and foot protection. Also included are hand, respiratory, and fall protection, as well as other personal protective equipment that is less common in the oil and gas production workplace.



### MODULE DESCRIPTIONS

- \ General personal protection equipment (PPE)
- \ Head protection
- \ Face and eye protection
- \ Hearing protection
- \ Foot and hand protection
- \ Respiratory protection
- \ Fall protection
- \ Other PPE

## PERSONAL PROTECTIVE EQUIPMENT: OVERVIEW

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Personal Protective Equipment (PPE) is a necessity on an oil or gas rig. To familiarize workers with how and when PPE should be used, this module addresses employee and job-planning orientation concerning PPE. The policies, preferences, and how to ask for guidance in the use of PPE are also discussed in this module.

## PERSONAL PROTECTIVE EQUIPMENT: HEAD PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Head protection in a rig environment is vital. Hard hats can save lives; thus the different types, the proper inspection process, and care-taking procedures should be second nature to anyone who is planning on working on a rig.

## PERSONAL PROTECTIVE EQUIPMENT: FACE AND EYE PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Dust, splashes, flying objects, and radiation are all hazards encountered on a rig and are most devastating when they come into contact with one's face. To prevent these kinds of accidents, it is important for workers to understand the different types of face and eye protection, limitations of PPE, and the proper care and use of their face and eye protection.

## PERSONAL PROTECTIVE EQUIPMENT: HEARING PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

Noise, often at excessive levels, is a constant presence in industrial jobs. In order to prevent hearing loss, workers in industrial settings need to be well-versed in the types of hearing protection and the limitations of each type. How to inspect, use, and properly combine different types of hearing protection in order to best protect and preserve auditory function are all crucial skills taught in this module.

## PERSONAL PROTECTIVE EQUIPMENT: FOOT PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Many factors pose a threat to a workers feet, making their protection a significant concern. As with most PPE, the key to effective use of foot protection lies in the knowledge of the types of foot protection available, inspection of footwear, and its proper care and use.

## PERSONAL PROTECTIVE EQUIPMENT: HAND PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Virtually all industrial jobs involve the use of ones hands, therefore protecting ones hands should be a paramount concern for every worker. To effectively protect the hands, a worker should understand the types of hand protection, how to inspect it for excessive wear or weaknesses, and how to use and care for their PPE appropriately.

## PERSONAL PROTECTIVE EQUIPMENT: RESPIRATORY PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In industrial settings, toxic substances frequently exist as particles in the air. Keeping these dangerous chemicals out of ones body requires respiratory protection, and every worker should be aware of the different types of respirators and canisters available to them. The inspection and proper care of this equipment in order to maintain the working order of the PPE is also detailed in this module.

## PERSONAL PROTECTIVE EQUIPMENT: FALL PROTECTION

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Fall Protection module will introduce types of personal protective equipment (PPE) used for fall protection, proper equipment inspection, and also the use and care of the equipment. By the end of the module students will understand how to mitigate dangers with fall protection while working at heights.

## PERSONAL PROTECTIVE EQUIPMENT: OTHER PPE

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Specialty Protective clothing module will focus on specialty protective clothing and its proper care and use. By the end of this module, students will understand distinctions between several types of specialty PPE including full-body suits, fire-retardant clothing, and chemical protective clothing.

## HEALTH AND HAZARDS (RGP3A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

This module covers certain types of hazards that are present in the oil and gas production workplace, as well as the difficulties of transporting hazardous materials. We also cover general health and first aid, and the responsibilities of those in the workplace regarding industrial hygiene, bloodborne pathogens, and planning for emergencies.



## **MODULE DESCRIPTIONS**

- \ Types of hazards
- \ Transportation and release of hazardous materials
- \ Responsibilities involving industrial hygiene hazards
- \ General health and first aid; Bloodborne pathogens
- \ Health and adverse weather
- \ Health and wildlife
- \ Planning for emergencies and alarms

## **HAZARD COMMUNICATION: TYPES**

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**LENGTH:** 2 Hours **CEU:** 0.2 Credits **LANGUAGES:** EN

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### **OVERVIEW**

In the Types of Hazards module students will become aware of effective hazard communication practices and the importance of the written plan. By the end of the module, students will become familiar with the necessity of keeping the chemical inventory up-to-date as well as keeping containers labeled properly. The module will also define the material safety data sheet, proper locations for the sheet, safety equipment, employee responsibilities, and training requirements.

## **HAZARD COMMUNICATION: TRANSPORTATION**

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**LENGTH:** 2 Hours **CEU:** 0.2 Credits **LANGUAGES:** EN

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### **OVERVIEW**

The Transportation of Hazardous Materials module will introduce students to information that must accompany the transportation of hazardous materials. By the end of the module students will become familiar with proper container markings, labels, or placards required for transport as well as how to complete shipping papers.

## **HAZARD COMMUNICATION: SPILL AND RELEASE**

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**LENGTH:** 2 Hours **CEU:** 0.2 Credits **LANGUAGES:** EN

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### **OVERVIEW**

In the Spill and Release module students will learn how to properly report uncontrolled, or the unauthorized release of hazardous materials. By the end of the module students will become familiar with the proper response to these threats and to mitigate user carelessness, inadequate container storage, and damaged or failing containers.

## **OCCUPATIONAL HEALTH: OVERVIEW AND EMPLOYEE RESPONSIBILITY**

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**LENGTH:** 2 Hours **CEU:** 0.2 Credits **LANGUAGES:** EN

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### **OVERVIEW**

The Occupational Health module will give an overview of health and industrial hygiene risks associated with work on a rig. Students will become familiar with the roles and responsibilities of the crew in maintaining health and safety standards and will learn about the training and certification requirements associated with each of these roles. By the end of the module, students will understand when to report suspicions concerning health hazards, will become familiar with the different types of exposure, and will learn how to monitor and mitigate hazards around the jobsite.

## **OCCUPATIONAL HEALTH: HAZARDS AT THE WORK SITE**

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**LENGTH:** 2 Hours **CEU:** 0.2 Credits **LANGUAGES:** EN

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### **OVERVIEW**

The Potential Hazards at the Work Site module identifies H2S risks and detection as well as risks from solvents and chemicals such as: benzene, lead, CO<sub>2</sub>, NORM, mercury, hexavalent chromium, methanol, welding fumes, N<sub>2</sub>, and several others. Students will familiarize themselves with other risks ranging from dangers from noise exposure and diesel misting from an oil based mud.

## HEALTH AND FIRST AID COURSE: GENERAL

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

By the end of this module, students will know how to locate emergency phone numbers, will understand the importance of responding to emergencies in a manner appropriate with their training, and will know what classifies a worker as being fit for duty.

## HEALTH AND FIRST AID COURSE: PATHOGENS

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Bloodborne Pathogens module covers the importance of avoiding contact with blood and other bodily fluids, proper precautions to take when dealing with these substances, and how to use protective barriers to avoid infection. Students will become familiar with appropriate handling of razor blades, needles, and will learn what qualifies as contaminated material.

## HEALTH AND FIRST AID COURSE: STAPH

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Staphylococcus aureus module will cover one of the most dangerous diseases on the rig known as Staph (Staphylococcus Aureus). Staph is a type of bacteria that can be spread in a variety of ways and must be properly treated and avoided with competence.

## HEALTH AND FIRST AID COURSE: ADVERSE WEATHER

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In the Health and Adverse Weather module, students will learn about the hazards of lightning, windstorms, tropical storms, tornados and how to deal with these situations appropriately. Hazards of UV exposure, snow and ice, as well as flooding and thermal stress will also be explained along with methods of prevention and mitigation.

## HEALTH AND FIRST AID COURSE: WILDLIFE SAFETY

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Health and Wildlife, Insects and Snakes module will inform students about animal life near the rig and will teach students how wildlife should be treated safely and handled correctly. The module will present an overview of possible wildlife encounters around the jobsite, including those that may occur when on an offshore installation, and will go on to describe how one should deal with these encounters in a safe and responsible way. Furthermore, the module describes safety precautions for working in environments with insects and snakes.

## EMERGENCY RESPONSE: PLANNING FOR EMERGENCIES

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Emergency Planning module will cover the importance of emergency planning and short-service employee roles. Emergency situations can arise quickly and sometimes without warning; thus it is important for workers to already have plans in place to avoid hesitation in responding to dangerous situations.

## EMERGENCY RESPONSE: ALARMS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In the Emergency Situations and Overview module, students will become familiar with various types of alarms, why they are necessary, and the proper response. It is important to understand the locations of emergency equipment and muster areas as well as the location of related information pertaining to emergency procedure.

## SPECIALIZED WORK PROCEDURES (RGP4A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this module we cover types of hazardous energy, lockout and tagout procedures, and different work permits. We also discuss employee's responsibilities when working in confined spaces, at heights, and while hoisting or lifting objects.



### MODULE DESCRIPTIONS

- \ Hazardous energy.
- \ Lockout and tagout.
- \ Work permits.
- \ Confined space and working at heights.
- \ Hoisting and lifting.

## SPECIALIZED PROCEDURES: HAZARDOUS ENERGY

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Hazardous Energy module will cover different types of energy and how to control for hazardous energy. Students will be able to clearly define an energized versus a de-energized situation and how to proceed safely in these circumstances.

## SPECIALIZED PROCEDURES: LOCKOUT TAGOUT

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Lockout/Tagout module provides an overview of definitions associated with energy isolation as well as an employee's roles and responsibilities. Students will become familiar with how to properly place a lock or a tag in a lockout/tagout situation and also how to institute a group lockout with multiple workers for multiple situations.

## SPECIALIZED PROCEDURES: WORK PERMITS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Work Permit module will offer an overview of the different types of permits such as, confined space, hot work, critical lifts, and other types of permits for work on the rig. Students will also become familiar with their roles and responsibilities involved in their permit process.

## SPECIALIZED PROCEDURES: CONFINED SPACE

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this module students will be exposed to what constitutes a confined space and the hazards associated with working in these spaces. While working in a confined space there are particular responsibilities associated with various roles; this unit will illustrate correct procedures and proper training for employees based on industry standards.

## SPECIALIZED PROCEDURES: HEIGHTS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Working at Heights module will introduce students to the importance of working at their level of training under these conditions as well as an overview of tasks and jobs completed at heights. The responsibility for preventing dropped objects and falls will be covered as well as the appropriate equipment necessary for safe practice.

## SPECIALIZED PROCEDURES: HOISTING AND LIFTING

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Hoisting and Lifting module will provide an overview of correct procedures and safe practices for hoisting equipment and materials so as to avoid personal injury.

## PERSONAL SAFETY RESPONSIBILITIES ON THE RIG (RGP5A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this module we discuss personal fire safety responsibilities and procedures when in the oil and gas production workplace. We also cover crane safety, manual material handling, and water safety and regulations.

### MODULE DESCRIPTIONS

- \ Fire safety and procedures
- \ Personal fire safety responsibilities
- \ Crane safety and regulations
- \ Manual material handling
- \ Water safety



## FIRE SAFETY: OVERVIEW

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Fire Safety module will provide an overview of fire protection, prevention, and detection. The unit will detail the fire triangle, proper storage of flammable and combustible materials, as well as ignition sources. Students will become familiar with different classes of fires as well as proper extinguishing methods and types of extinguishers.

## FIRE SAFETY: EMPLOYEE RESPONSIBILITIES

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Employee Responsibility module will familiarize students with correct procedures for reporting fires and fire hazards, onsite fire protection requirements, as well as location-specific escape routes. Students will also be made aware of the restrictions against tampering with fire extinguishers, will review the best practices for using fire extinguishers, and will learn how to safely participate in a fire drill. The module will also detail the emergency evacuation plan posted on a rig's station bill (muster list).

## MATERIALS HANDLING: MECHANICAL EQUIPMENT

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Mechanical Equipment module will detail how an employee should conduct themselves safely while working near cranes, cherry-pickers, and forklifts. Students will understand the importance of never walking under a suspended load as well as never positioning themselves under an immovable object. The module will also cover proper communication between those on the deck and the operator as well as keeping an awareness of the best escape route in case of a dangerous circumstance.

## MATERIALS HANDLING: MANUAL MATERIAL HANDLING

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Manual Materials handling module will cover proper lifting techniques to ensure back protection as well as the reasons for common injuries when lifting. At the end of this module, students will be familiar with appropriate lifting procedures and adequate alternatives to manual lifting.

## WATER SAFETY: WATER SAFETY

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Water Safety module will help students become familiar with personal flotation devices, survival crafts, and standby rescue vessels.

## PLATFORM ARRIVAL PROCEDURES AND ENVIRONMENT REGULATIONS (RGP6A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

Here, we discuss the policies and procedures for entering the rig environment and environmental regulations concerning waste management, reporting waste, and marine debris policies while in the oil and gas production workplace.

### MODULE DESCRIPTIONS

- \ Entering the rig environment
- \ Environmental regulations
- \ Waste management
- \ Response and reporting waste
- \ Marine debris policies



## RIG PLATFORM ENVIRONMENT COURSE: PLATFORM OR LOCATION ARRIVAL

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In the Platform/Location Arrival Procedures module students will become familiar with correct procedures and important information when gathering to board the rig. The unit will cover the proper use of rig walkways, handrails, baggage handling, and sign-in procedures. Students will also learn the importance of treating the rig as their home by being exposed to preparation for extended stay and appropriate personal items to bring aboard. The module will also cover site-specific orientation and necessary precautions.

## WELLSITE ENVIRONMENTAL PROTECTION: OVERVIEW

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Environmental Compliance Overview module serves as a general rubric for measuring compliance with environmental protection regulations. By the end of the module, students will better understand how to evaluate compliance with regulations and will be familiarized with many of the regulations themselves.

## WELLSITE ENVIRONMENTAL PROTECTION: WASTE MANAGEMENT

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

The Waste Management module will cover how to properly store and minimize waste. To ensure that the wellsite environment is protected, employees on an instillation must be aware of their responsibilities to correctly handle waste created on the rig.

## WELLSITE ENVIRONMENTAL PROTECTION: SPILL REPORTING

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In this unit students will learn the proper methods for responding to and reporting on events or situations that could compromise the wellsite environment. While no one plans for there to be a wellsite accident such as a leak or spill, it is nonetheless important to understand the procedures for handling these types of situations if they occur. Each rig has specific policies in place for responding to disasters, and this module is not meant to replace these. Rather, it serves to emphasize the importance of general attentiveness when on the jobsite and to introduce response procedures common to all wellsites.

## MARINE DEBRIS: MARINE DEBRIS

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

In the Marine Debris module students will become familiar with both the identification and correct procedures for reporting debris offshore. Despite both domestic and international efforts for minimization, marine debris has increased in the form of common domestic materials to discarded fishing gear and even abandoned industrial equipment. This unit will allow students to become familiar with regulatory policy and also help establish general awareness for a problem requiring adequate attention for any offshore instillation.



## SHORE BASE ARRIVAL (RGP7A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In this module we go over the aspects of entering the rig environment, such as safe helicopter and boat transportation. We also discuss swing rope procedures and how to safely use personnel baskets.



### MODULE DESCRIPTIONS

- \ Entering the rig environment
- \ Safe helicopter transportation
- \ Safe boat transportation
- \ Swing rope procedures
- \ Personnel baskets

## TRANSPORTATION: HELICOPTER

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The Helicopter Transportation module will cover the responsibility of passengers and the need for respecting the authority of the pilot. Students will also be informed on the proper procedure for boarding and disembarking the helicopter, avoiding hazardous components, and securing baggage and loose items. Smoking restrictions, emergency devices, and orientation procedures will also be covered in the module.

## TRANSPORTATION: BOAT

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In the Boat Transportation module students will be exposed to the necessary PPE required when boarding or exiting a vessel, responsibilities of passengers as well as respecting the authority of the captain, and what to do in case of an emergency.

## TRANSPORTATION: SWING ROPES

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In this unit students will learn the typical locations for swing ropes on the rig as well as guidelines for safe usage. On a typical rig, there are various types of swing ropes available for use, however this method is becoming less common to the Personnel Basket.

## TRANSPORTATION: PERSONNEL BASKETS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The Personnel Basket module describes and shows the common types of personnel baskets and their associated components. Seen as a much safer alternative to swing ropes, the personnel basket, sometimes referred to as a personnel net, nonetheless requires careful attention to safety procedures if injury is to be avoided. After completing this module, students will understand the necessary precautions to be observed when riding in the basket and the limitations associated with this method of transferring personnel to and from the rig.

## LAND CERTIFICATION (RGP8A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In this module we cover the role of site workers, their personal protective equipment, and rescue procedures. We also discuss the hazards and safety regulations concerning pits, ponds, trenching, and shoring.

### MODULE DESCRIPTIONS

- \ Hazards and safety regulations concerning pits, ponds, trenching, and shoring
- \ The role of site workers
- \ Personal protective equipment
- \ Rescue procedures



## LAND CERTIFICATION: PITS AND PONDS

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

The Pits and Ponds Safety module will explain the types of pits and ponds as well as their particular purpose. The unit will review necessary precautions to mitigate hazardous factors while working near both pits and ponds. Students will become familiar with various types of fluid storage and waste disposal in order to enhance safety awareness on location.

## LAND CERTIFICATION: TRENCHING AND SHORING

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

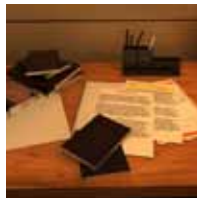
In the Trenching and Shoring module students will learn how to ensure safety within regulatory requirements as well as safe work practices. The role of the Site Worker or “Competent Person” will be clearly defined for students to understand the functionality and responsibilities of this position. Hazards relating to excavation/trenching and methods of prevention will be detailed along with the use of personal protective equipment PPE. Appropriate procedures related to hazardous atmospheres and emergency situations will also be covered.

## SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM (SEMS) AWARENESS (RGP9A\_0)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

In this module we introduce Safety and Environment Management Systems (SEMS). In November, 2011, SEMS regulations became required for all Outer Continental Shelf (OCS) operations under the jurisdiction of Bureau of Safety and Environmental Enforcement (BSEE). This module spreads awareness of SEMS regulations, the 13 elements of SEMS, and responsibilities required by SEMS for operators, contractors, and workers.



### MODULE DESCRIPTIONS

- \ Learn what SEMS is.
- \ Learn the requirements of SEMS.
- \ Learn how SEMS affects employees.

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# PRODUCTION OPERATIONS

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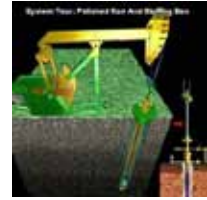
The Production Operations Library covers common techniques used in the production phase of oil and natural gas wells in surface and sub-surface systems. Gas lift, sucker rod pumping and electric submersible electric pumping systems for artificial lift allow low pressure reservoirs to be produced, as well as increasing flow rates in naturally-flowing wells. Measuring fluid volumes – liquid and gas - on an oil field is necessary for accounting, process monitoring and custody transfer. Perforating liners allows fluids to travel from a formation into the production tubing, and can be accomplished with a variety of different systems. Downhole tools and equipment performing a wide variety of functions are commonly lowered into the wellbore using slicklines. Knowledge of the techniques and technologies used in slickline operations is valuable for new, administrative and support personnel. Learning the functions and controls of sub-surface safety valves allows rig workers to minimize the negative effects of environmental complications. Identifying surface facilities and their configuration, operating principles, and function provides personnel unfamiliar with surface operations a working knowledge of these systems.

# ARTIFICIAL LIFT (ARTLIFT)

LENGTH: 12 Hours CEU: 1.2 Credits LANGUAGES: EN

## OVERVIEW

Artificial Lift introduces the techniques and technologies involved in artificial lift, with specific attention to sucker rod pumping, gas lift, and electric submergible pumps. The course provides a useful knowledge foundation to professionals in every sector of the industry, and of immediate value to field personnel. Each functional component of the sucker-rod pumping system is presented, and the major geometries of pumping units are defined with respect to their specific application and utilization. The operation of three different gas lift configurations is described. Detailed graphics illustrate the basic components and operation of electric submergible pumps. The relative advantages and disadvantages of each artificial lift method are compared and discussed. This course comprises six computer-based training modules, each one representing over an hour and a half of instruction and exercises.



## MODULE DESCRIPTIONS

**1. Sucker Rod Pumping, Volume 1** \ Volume 1 introduces pumping unit and sucker-rod pumping systems. It describes the functional surface components of a sucker-rod pumping system, and their various geometries and configurations.

**2. Sucker Rod Pumping, Volume 2** \ Volume 2 describes pumping unit and sucker-rod pumping systems with specific attention to the sub-surface components. It describes how static, dynamic, and cyclic loading lead to rod stress, fatigue, and failure. Sub-surface pumps, tubing, and gas anchors are also covered.

**3. Gas Lift, Volume 1** \ The first Gas Lift module introduces the components, equipment, and applications of gas lift systems. Compressors, separators, control and metering equipment are described in detail. It also explains the principles of artificial lift, and the advantages and limitations of gas lift.

**4. Gas Lift, Volume 2** \ The second Gas Lift volume discusses the operational and design aspects of gas lift systems. It describes the sequence of events in unloading and operating the well, explains continuous and intermittent lift, and compares different gas injection rates, tubing sizes, and choke settings.

**5. Electric Submergible Pumps, Volume 1** \ This module introduces the components, theory, and operations of electric submersible pumping systems. It explains the principles behind a centrifugal pump, and describes the components of an ESP in detail. Pump performance characteristics and optimum ranges are also discussed.

**6. Electric Submergible Pumps, Volume 2** \ This module covers electric submersible pump components and performance. Pump intakes and protectors are described, along with the effects of gas lock. Electric motors and cables are also described. The module concludes by discussing associated surface systems.

## OILFIELD METERING PRIMER (OILMET)

LENGTH: 6 Hours CEU: 0.6 Credits LANGUAGES: EN

### OVERVIEW

This primer on Oilfield Metering reviews the methods used to measure fluid volumes in the oilfield for accurate accounting, process monitoring, and custody transfer. Liquid metering techniques are discussed first, followed by gas metering. The first part of the course concerns methods of liquid metering. Positive displacement, turbine, vane, paddle, orifice, and vortex meters are described. Maintenance, wear, and the effects of gas and solids in the liquid stream are reviewed. The second part of the course concerns methods of gas measurement. The unit describes orifice metering equipment in detail, and emphasizes the importance of maintenance and inspection. Methods of recording accurate measurements are reviewed, and the equations for calculating gas volumes are explained. This Oilfield Metering Primer comprises three computer-based training modules, each representing two hours of instruction and exercises.



### MODULE DESCRIPTIONS

**1. Liquid Metering** \ Oilfield applications of liquid metering are covered in this module, and various liquid metering systems are described in detail. Maintenance concerns are also explained, with attention to the effects of gas, solids, turbulence, and normal wear on metering equipment.

**2. An Introduction to Gas Metering** \ The first Gas Metering module covers the basic theory of gas measurement through an orifice. It describes metering equipment, measurement and recording devices, and gas flow calculations. The module explains how to read chart data and concludes with two gas flow simulations.

**3. An Introduction to Gas Metering Techniques and Components** \ Equipment specifications and the importance of proper installation, inspection, and maintenance are reviewed in the second volume of Gas Metering. Causes and solutions for common problems are discussed. The module also covers the operation and advantages of gas flow computers.

## PERFORATING FUNDAMENTALS (PERF)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

This course on Perforating Fundamentals explains the basic concepts of perforating, including safety around explosives and the potential consequences of mistakes. It reviews topics related to shaped charges, including their design, completion, and detonation, as well as standoff, interference, and the manufacturing and performance of the shaped charge. The course then introduces perforating guns, including capsule guns, carrier guns, and pivot guns. Debris control and gun size are also discussed, along with tips on how to maximize clearance. The importance of the entrance hole diameter is reviewed. The course describes how perforating guns are run and fired in a well. A full range of firing systems and related equipment are discussed in the context of their field use. The course emphasizes safety procedures that must be followed in the field. It concludes with a review of supplemental equipment and perforating accessories.



## MODULE DESCRIPTIONS

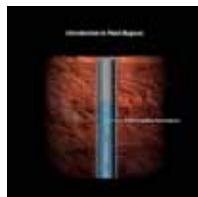
- \ Basic perforating components, equipment, operations, and design considerations.
- \ Explain the safety measures taken in perforating operations.
- \ Explain the principles behind a shaped charge.
- \ Describe different deployment options and equipment for perforating guns.
- \ Differentiate between wireline and tubing deployed depth correlation methods.
- \ Describe the operation of the basic firing mechanism for perforating guns.
- \ List the three types of firing actuation.
- \ Describe the operation of mechanical-based and pressure-based firing actuators.

## **SLICKLINE OPERATIONS (SLOP)**

LENGTH: 10 Hours CEU: 1 Credits LANGUAGES: EN

### OVERVIEW

Slickline Operations introduces the techniques and technologies involved in working with slickline and braided wireline. The course covers wireline jars and jarring operations, surface equipment, basic wireline tools, and applications specific to gas lift operations. Slickline Operations supplies a firm foundation knowledge of the practices and terminology that benefits not only new personnel in the field, but also those in administrative and support roles. This course consists of five computer-based training modules, each representing two hours of instruction and exercises. A reference dictionary of terms and abbreviations common to slickline operations is also included.



### MODULE DESCRIPTIONS

**1. An Introduction to the Types and Applications of Wireline and Slickline** \ The first Slickline Operations module demonstrates the types and applications of wireline and slickline. Measuring techniques, spooling, and hydraulic circuits are explained. Important safety procedures are also covered.

**2. An Introduction to the Major Components of the Wireline Toolstring** \ The second module details the major components of the wireline toolstring and explains jarring operations. Physical forces of wireline jarring are illustrated through interactive simulation.

**3. An Introduction to the Safe Deployment and Operation of Equipment** \ The safe deployment and operation of wireline surface equipment is covered in the third volume of Slickline Operations. It explains methods of controlling well pressure, and breaks down the rigging-up sequence step by step.

**4. An Introduction to the Basic Wireline Tools** \ This module describes basic wireline tools in detail, covering shape and critical dimension. The practical field applications of each tool are demonstrated, along with associated safety practices. Additional relevant information on fluid by-pass and shear pin strength is also included.

**5. An Introduction to Gas Lift** \ The fifth and final Slickline Operations module concerns gas lift. It describes the specialized equipment used to run and retrieve gas lift valves from a well. The design and application of latches, side pocket mandrels, and kickover tools are also discussed.

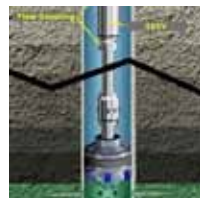
**An Introduction to Abbreviations for Slickline Operations** \ This module serves as a terminology primer for field personnel new to slickline operations, and as an electronic reference for more experienced field hands. Definitions generally concern slickline operations, but also include common terms found in field procedures and reports.

## SUBSURFACE SAFETY VALVES (SSSV1)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

This course introduces the purpose, operation, and application of Sub-surface Safety Valves. Case studies demonstrate the need for setting the valves at certain depths. Environmental complications encountered in sub-sea installations, arctic conditions, extreme temperatures, and even earthquake-prone regions are covered. Surface and subsurface controlled downhole safety valves are described, accompanied by detailed animations and graphics demonstrating the valves' operation.



### MODULE DESCRIPTIONS

- \ Describe surface and subsurface safety valve systems.
- \ Identify the various types of safety valves.
- \ Differentiate between subsurface and surface-controlled subsurface safety valves.
- \ Describe how various safety valves operate.
- \ Identify and describe the functions of the various components of a safety valve.

## SURFACE FACILITIES PRIMER (SURFAC)

LENGTH: 8 Hours CEU: 0.8 Credits LANGUAGES: EN

### OVERVIEW

The Surface Facilities Primer introduces the equipment typically used to process fluids produced from oil wells, describing the identification, internal configuration, principles of operation, and contribution to the overall system of each of the major pieces of oilfield surface equipment. Emulsion breaking and the separation of oil, gas, and water are discussed. The course also covers the handling, storage, and transportation of hydrocarbons produced from the well. Two subjects in particular are afforded specific attention in this course: One module covers the function and operation of reciprocating compressors. Another provides detailed procedures for coupling alignment. The Surface Facilities Primer course comprises four computer-based training modules, each one representing over an hour and a half of instruction and exercises.



### MODULE DESCRIPTIONS

**1. Surface Facilities, Volume 1** \ The two main functions of surface facilities are explained in this module: separating oil, water, and gas; and testing production capability. The module describes surface system components, processes for separating fluids and breaking emulsions, and well testing facilities.

**2. Surface Facilities, Volume 2** \ The second Surface Facilities module details the handling of crude oil, natural gas, and water produced from a well. Metering systems, storage facilities, and transportation options for oil and gas are described, along with treatment and disposal alternatives for waste water.

**3. Reciprocating Compressors** \ This module explains the operating principles and field applications of reciprocating gas compressors. It compares natural gas drivers with electrical drivers, and describes the function of aerial coolers. The module concludes with a discussion of gas flow control systems.

**4. Coupling Alignment** \ This module explains the importance and function of coupling alignments. Tools and equipment used in alignment procedures are described, together with various alignment conditions. Preliminary checks and alignment techniques are presented step by step.

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## ELECTRICAL LIBRARY

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The Electrical Library covers in detail the various tools, documents and equipment used by the petroleum industry from ammeters to AC/DC motors. Electricity is vital to the operations on a rig, platform or any other oil and gas facility. AC/DC motor theory and maintenance courses teach electricians, mechanics and technicians the necessary skills to operate and maintain motors used by oil and gas companies. Wiring a facility requires a complete knowledge of conduit systems, including installation, bending, conduit types and components. Once installed, the maintenance and proper use of these systems depends on the ability of site electricians and electronics technicians to read electrical prints, use a wide range of tools and meters, and troubleshoot problems. As always, safety training for personnel working with and around powerful electric systems increases awareness and helps prevent accidents.



## AMMETERS, MEGGERS AND WHEATSTONE BRIDGE LIBRARY (AMW)

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LENGTH: 10 Hours CEU: 1 Credits LANGUAGES: EN

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### OVERVIEW

This library consists of five lessons. This library is designed for participants familiar with AC/DC theory, electrical safety, and electrical print reading. A basic understanding of electronic devices and circuits is recommended. The library describes megohmmeters, Wheatstone bridges, and clamp-on ammeters. It gives examples of the use of these instruments, identifies their components, and defines their functions. The lessons also describe safety and selection considerations for their use, how to set up the instruments, how to connect them to the systems under test, and how to take and read measurements.



## INTRODUCTION TO MEGOHMMETERS (1AMW)

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

This is the first lesson in Ammeters, Meggers, and Wheatstone Bridge Library. This lesson explains Ohm's Law and how it is used when analyzing test results. The basic components, uses, and functions of a megohmmeter are described. Insulation and causes of insulation damage are also covered.

### MODULE OBJECTIVES

- \ Explain the formula and how a working knowledge of Ohm's Law is helpful when analyzing test results.
- \ Describe, and give an example of, the use of a megger; Define the function of a megger.
- \ List the causes of damaged insulation; Describe the causes and effects of low resistance readings.
- \ Identify the basic components of a typical megger; Identify the switches on a digital megger.

## USING THE MEGOHMMETER (2AMW)

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LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

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### OVERVIEW

This is the second lesson in the Ammeters, Meggers, and Wheatstone Bridge Library. This lesson describes safety issues to consider when using a megohmmeter, how to select the correct megger for the job, setup, and the steps necessary to take a megger reading.

### MODULE OBJECTIVES

- \ Describe safety considerations when using a megohmmeter.
- \ List considerations and procedures when selecting, setting up, and reading a megger.

## WHEATSTONE BRIDGE (3AMW)

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LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Ammeters, Meggers, and Wheatstone Bridge Library. This lesson explains what a bridge circuit is, the purpose and components of a Wheatstone bridge, and its function.

### MODULE OBJECTIVES

- \ Define a bridge circuit.
- \ Identify the components of a Wheatstone bridge.
- \ Define the function of a Wheatstone bridge.

## USING A WHEATSTONE BRIDGE (4AMW)

LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This is the fourth lesson in the Ammeters, Meggers, and Wheatstone Bridge Library. This lesson explains how to balance a Wheatstone bridge and the process used to set mechanical and electrical zero. How to interpret the readings of a Wheatstone bridge is also explained.

### MODULE OBJECTIVES

- \ Describe how to balance a Wheatstone bridge.
- \ Describe how to set mechanical and electrical zero on a Wheatstone bridge.
- \ Describe how to take a reading with a Wheatstone bridge.
- \ Describe how to interpret a Wheatstone bridge reading.
- \ Interpret a Wheatstone bridge reading.

## CLAMP-ON AMMETERS (5AMW)

LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Ammeters, Meggers, and Wheatstone Bridge Library. This lesson presents the components and features and functions of clamp-on ammeters. The lesson also describes safety considerations that should be noted when selecting a clamp-on ammeter. Instruction in the procedures for setting up, taking readings, and modifying the range of a clamp-on ammeter are also covered.

### MODULE OBJECTIVES

- \ Identify the components of a clamp-on ammeter.
- \ Describe the range function of a clamp-on ammeter.
- \ Define the function of a clamp-on ammeter.
- \ Describe safety and selection considerations for using a clamp-on ammeter.
- \ Define the “record and lock” features.
- \ Describe the procedures for setting up a clamp-on ammeter.
- \ Describe how to take a reading and modify the range of a clamp-on ammeter.

## AC/DC MOTOR MAINTENANCE LIBRARY (MM)

LENGTH: 24 Hours CEU: 2.4 Credits LANGUAGES: EN

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### OVERVIEW

This lesson was designed to provide training for electricians, mechanics, and others, wanting to know more about AC and DC motor maintenance. This library consists of 12 interactive, on-line lessons that addresses AC and DC motor maintenance.



## INTRODUCTION TO AC MOTOR MAINTENANCE (IAM)

LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the AC/DC Motor Maintenance Library. The lesson explains the purpose of AC motor maintenance programs and the types of motor maintenance. The lesson also identifies safety procedures that should be used during motor maintenance.

### **MODULE OBJECTIVES**

- \ Identify types of motor maintenance and characteristics of a motor maintenance program.
- \ Identify safety procedures to use during motor maintenance.

## **RECORDS, TOOLS, AND INSTRUMENTS (RTI)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### **OVERVIEW**

This is the second lesson in the AC/DC Motor Maintenance Library. The lesson explains the purpose of keeping complete and accurate records using various record keeping formats. The lesson also identifies tools and instruments used for given tasks in motor maintenance.

### **MODULE OBJECTIVES**

- \ Identify reasons for having a record keeping system.
- \ Identify categories of information for a record keeping system.
- \ Select the appropriate motor maintenance tools and instruments for given tasks.

## **PREVENTIVE AC MOTOR MAINTENANCE (PMM)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### **OVERVIEW**

This is the third lesson in the AC/DC Motor Maintenance Library. The lesson explains aspects of preventive motor maintenance, the steps in inspecting a motor for general maintenance and for identifying problems, and cleaning and lubricating a motor as part of a preventive motor maintenance program.

### **MODULE OBJECTIVES**

- \ Identify characteristics of preventive motor maintenance.
- \ Inspect a motor for general maintenance and for identifying problems.
- \ Clean and lubricate a motor as warranted by a preventive maintenance inspection.

## **MEASUREMENT IN PREVENTIVE AC MOTOR MAINTENANCE (MPM)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### **OVERVIEW**

This is the fourth lesson in the AC/DC Motor Maintenance Library. The lesson demonstrates the need for taking measurements, and the importance of comparing measurements. Causes and effects of current variations, temperature extremes, and vibration measurements are described.

### **MODULE OBJECTIVES**

- \ Explain the need for taking measurements in preventive motor maintenance.
- \ Explain the importance of comparing measurement readings.
- \ Take current measurements in preventive motor maintenance.

## **PREPARING FOR PERIODIC AC MOTOR MAINTENANCE (PPM)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### **OVERVIEW**

This is the fifth lesson in the AC/DC Motor Maintenance Library. The lesson identifies the characteristics of periodic motor maintenance and the major components of an AC motor. Instruction in testing winding resistance, and winding insulation resistance, as part of pre maintenance testing is given.

### MODULE OBJECTIVES

- \ Identify characteristics of periodic motor maintenance.
- \ Identify the major components of an AC motor.
- \ Perform pre-maintenance testing: Winding insulation resistance.
- \ Perform pre-maintenance testing: Winding resistance.

## **MOTOR DISASSEMBLY AND REASSEMBLY IN PERIODIC AC MOTOR MAINTENANCE (MAD)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the AC/DC Motor Maintenance Library. This lesson teaches the procedures for proper disassembly, cleaning, inspection, and reassembly of an AC motor.

### MODULE OBJECTIVES

- \ Describe how to properly disassemble an AC motor for periodic motor maintenance.
- \ Disassemble an AC motor.
- \ Identify the proper way to clean a disassembled AC motor.
- \ List the various AC motor parts and what to look for during inspection.
- \ Describe how to reassemble an AC motor.
- \ Reassemble an AC motor.
- \ Describe how to perform post-maintenance testing.

## **CORRECTIVE MAINTENANCE FOR AC MOTORS (CMM)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the AC/DC Motor Maintenance Library. This lesson discusses causes and corrective actions for various motor malfunctions.

### MODULE OBJECTIVES

- \ Identify causes and corrective actions for a motor that won't start.
- \ Identify causes and corrective actions for a motor with abnormal noise.
- \ Identify causes and corrective actions for a motor overheating.
- \ Identify causes and corrective actions for a motor with overheated bearings.

## **INTRODUCTION TO DC MOTOR MAINTENANCE (1DCM)**

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eighth lesson in the AC/DC Motor Maintenance Library. This lesson introduces participants to DC motors and compares them to AC motors.

### MODULE OBJECTIVES

- \ Identify similarities between AC and DC motors.
- \ Identify the difference between AC and DC motors.
- \ Identify components of a DC motor commutator and their function.
- \ Identify factors that affect commutation.

## COMMUTATOR INSPECTION (2DCM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The ninth lesson in the AC/DC Motor Maintenance Library, this lesson shows participants how to identify some problems that affect the commutator.

### MODULE OBJECTIVES

- \ Describe the color of the commutator and explain the function of the oxide film.
- \ Identify the causes of high mica and corrective actions.
- \ Identify the causes of uneven segments and corrective actions.
- \ Identify the causes of thrown solder and corrective actions.

## COMMUTATOR WEAR (3DCM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the tenth lesson in the AC/DC Motor Maintenance Library. This lesson trains participants to recognize friction damage, streaking, threading, and grooving, the cause of these problems, and corrective actions.

### MODULE OBJECTIVES

- \ Identify wear patterns, their causes, and corrective actions.
- \ Identify the causes of arcing and corrective actions.
- \ Identify the causes of high mica and corrective actions.

## COMMUTATOR MAINTENANCE (4DCM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eleventh lesson in the AC/DC Motor Maintenance Library. The lesson demonstrates the process of preparing a commutator for reconditioning, how to properly cut mica, how to check the commutator after maintenance, and explains the purpose of performing a commutator run-in procedure.

### MODULE OBJECTIVES

- \ Explain how to prepare a commutator for reconditioning.
- \ Explain how to undercut the mica of a commutator.
- \ Describe how to clean and check the commutator after maintenance.
- \ Explain the purpose of performing a commutator run-in procedure.

## BRUSH MAINTENANCE (5DCM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the AC/DC Motor Maintenance Library. The lesson describes how to select and inspect brushes. The lesson identifies the procedures for cleaning, inspecting, and setting the height of a brush holder. How to seat brushes and adjust spring pressure is demonstrated.

### MODULE OBJECTIVES

- \ Describe how to inspect various aspects of a brush.
- \ Identify the factors to be considered when selecting a brush.
- \ Identify the procedures for cleaning and inspecting the brush holders.
- \ Identify the steps involved in setting the height of a brush holder.
- \ Identify the procedure for installing brushes.
- \ Explain how to seat brushes.
- \ Explain how to adjust spring pressure.

## AC/DC MOTOR THEORY LIBRARY (MT)

LENGTH: 22 Hours CEU: Credits LANGUAGES: EN

### OVERVIEW

The AC/DC Motor Theory library was specifically developed for electricians and electronic technicians as well as for the multi-craft training needs of process and manufacturing facilities. This library consists of 11 interactive, on-line lessons that address AC and DC motor theory.



## INTRODUCTION TO AC COMPONENTS AND MOTORS (ACT)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the AC/DC Motor Theory Library. This lesson identifies the components of an AC motor and explains their functions. Basic magnetic principles, sine waves, methods of increasing magnetic flux in a conductor, and how a rotating field is created in an AC Motor are presented.

### MODULE OBJECTIVES

- \ Identify the components of an AC Motor and explain their function.
- \ Explain the basic principles of magnetism.
- \ Interpret the characteristics of a current as represented on a sine wave.
- \ Describe the effect of AC current on a conductor.
- \ Describe the methods of increasing magnetic flux in a conductor.
- \ Explain how a rotating field is created in an AC Motor.

## ADVANCED AC MOTOR PRINCIPLES (AMP)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

The second lesson in the AC/DC Motor Theory Library, this lesson explains synchronous speed and how to calculate it. The lesson demonstrates the relationship between phased current and rotor spin and induction and its effect on a rotor. Slip and how to calculate slip using its formula are also covered.

### MODULE OBJECTIVES

- \ Explain and be able to calculate synchronous speed.
- \ Explain induction and its effect on a rotor.
- \ Explain the relationship between phased current and rotor spin.
- \ Explain slip and know its formula.

## THREE-PHASE MOTORS - PART 1 (TPA)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the AC/DC Motor Theory Library. This lesson defines and explains the components and functions of various three-phase motors. The lesson also defines torque and explains its role in motor operation.

### MODULE OBJECTIVES

- \ Describe the design of a squirrel cage rotor and function of components.
- \ Describe the design of a wound rotor and function of a wound rotor's components.
- \ Define torque and explain its role in motor operation.
- \ Explain the design of a reluctance motor and how it works.

## THREE-PHASE MOTORS - PART 2 (TPB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fourth lesson in the AC/DC Motor Theory Library. This lesson defines and explains the components and functions of externally excited motors, starters, and variable speed drives. There is also a review topic to reinforce the information covered in the lesson, Three-Phase Motors – Part 1.

### MODULE OBJECTIVES

- \ Explain the design of an externally excited motor.
- \ Explain how an externally excited motor works.
- \ Explain the function of a motor starter and the most common types of motor starters.
- \ Describe a variable speed drive and its effect on voltage and frequency.

## SINGLE-PHASE MOTORS (SPM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fifth lesson in the AC/DC Motor Theory Library. This lesson trains the participants to distinguish single-phase motors from three-phase motors. Split-phase motors and capacitance start motors are discussed.

### MODULE OBJECTIVES

- \ Distinguish a single-phase motor from a three-phase motor.
- \ Explain the design of a split-phase motor and how it works.
- \ Explain the design of a capacitance start motor and how it works.

## INTRODUCTION TO DC MOTORS (IDCM)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the AC/DC Motor Theory Library. This lesson introduces the learner to DC Motors and their basic components.

### MODULE OBJECTIVES

- \ Identify the general characteristics and advantages of a DC motor.
- \ Identify the basic components of a DC motor.
- \ Explain the function of DC motor components.
- \ Identify the components of the armature and brush assembly; explain their function.

## INTRODUCTION TO DC MOTOR THEORY (IDCA)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the AC/DC Motor Theory Library. The lesson introduces participants to DC motor theory.

### MODULE OBJECTIVES

- \ Explain the effect of armature current on the main flux field and motor action
- \ Explain the process of commutation and how it maintains direct current in a DC motor.
- \ Describe how the number of windings and commutator segments effects torque and mechanical power of a DC motor.

## ARMATURE REACTION, COMPENSATION, AND INDUCED VOLTAGE (IDCP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The eighth lesson in the AC/DC Motor Theory Library, this lesson demonstrates armature reaction, compensation, and induced voltage.

### MODULE OBJECTIVES

- \ Explain how armature reaction shifts the neutral plane in a DC motor.
- \ Explain how armature reaction affects motor operation.
- \ Explain what measures will correct armature reaction.
- \ List the requirements for induced voltage in a motor.
- \ Explain counter-EMF.

## SERIES, SHUNT, AND COMPOUND DC MOTORS (DCMA)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the ninth lesson in the AC/DC Motor Theory Library. This lesson instructs the participant in the design of series wound, shunt wound, and compound DC motors and how they work.

### MODULE OBJECTIVES

- \ Explain the design of a series wound DC motor and how it works.
- \ Explain the design of a shunt wound DC motor and how it works.
- \ Explain the design of a compound wound DC motor and how it works.

## PERMANENT MAGNET, UNIVERSAL, AND BRUSHLESS DC MOTORS (DCMB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the tenth lesson in the AC/DC Motor Theory Library. This lesson instructs the student in the design of permanent magnet, universal, and brushless DC motors and how they work.

### MODULE OBJECTIVES

- \ Explain the design of a permanent magnet DC motor and how it works.
- \ Explain how a universal motor runs off of DC power.
- \ Explain the design of a brushless DC motor and how it works.



## DC MOTOR CONTROLS (DCMC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the AC/DC Motor Theory Library. This lesson trains participants in starters, rotation direction, speed control, and drive controls of DC motors.

### MODULE OBJECTIVES

- \ Explain why a reduced voltage starter is sometimes needed in a motor.
- \ Explain how a reduced voltage starter works.
- \ Explain what determines the direction of rotation of a DC motor.
- \ Explain how a reverse contactor works.
- \ Explain how to control the speed of a DC motor.
- \ Explain how a tapped resistor works.
- \ Explain a DC drive's control system and how it works.

## CONDUIT INSTALLATION LIBRARY (CBI)

LENGTH: 6 Hours      CEU: 0.6      LANGUAGES: EN

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### OVERVIEW

This library consists of three lessons designed for the training of electricians as well as for the multi-craft training needs of process and manufacturing facilities. This library provides instructions and interactions concerning general conduit bending and installation, in accordance with the National Electrical Code (NEC). This lesson defines a conduit system, lists general specifications for use of types of conduit, and introduces the major components or materials of a basic conduit system. This lesson also demonstrates and provides instruction on general methods and practices for cutting, cleaning, bending and installing conduit.



## CONDUIT SYSTEM MATERIALS (1CBI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Conduit Installation Library. This lesson introduces the learner to conduit systems and components, and instructs in the use of trade size and fill charts.

### MODULE OBJECTIVES

- \ Define conduit and types and explain how conduit trade size is measured.
- \ Read and use a conduit fill chart.
- \ Determine the uses for types of conduit.
- \ Identify boxes and their purpose and explain how boxes are sized.
- \ Identify fittings and their uses.
- \ Explain the purpose of EIs and T-conduits.

## CONDUIT BENDING (2CBI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Conduit Installation Library. This lesson instructs the learner in the proper methods of cutting, cleaning, and bending conduit. The lesson also demonstrates how to make various bends and when different bends are used.

## MODULE OBJECTIVES

- \ Explain the methods for cutting and threading conduit.
- \ Explain the methods and reasons for cleaning conduit.
- \ Identify benders and their uses.
- \ Define the common markings of a hand bender.
- \ Measure for and make a 90 degree bend.
- \ Identify an offset bend and its uses; Make an offset bend using an offset chart.
- \ Identify a saddle bend and its uses; Make and use a three and four bend saddle.

## CONDUIT LAYOUT AND INSTALLATION (3CBI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This final lesson in the Conduit Installation Library explains the procedure used to plan, measure, and install a conduit system.

### MODULE OBJECTIVES

- \ Plan a layout of a conduit installation.
- \ Measure for a conduit installation.
- \ Explain the methods for installing conduit.
- \ Support a conduit system.
- \ Explain the methods for installing conductors.

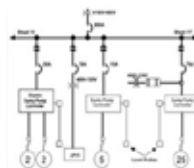
## ELECTRICAL PRINT READING LIBRARY (EPR)

LENGTH: 16 Hours      CEU: 1.6 Credits      LANGUAGES: EN

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### OVERVIEW

This lesson was designed to provide training for electricians, mechanics, and others, wanting to know more about electrical print reading. The eight lessons in this library present general information about electrical schematics and electrical diagrams showing and explaining how to read and interpret the symbols on electrical schematics and electrical diagrams.



## INTRODUCTION TO ELECTRICAL SCHEMATICS (1ESC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Electrical Print Reading Library. This lesson teaches about input, logic, and output devices, and the state in which symbols are drawn on electrical schematics.

### MODULE OBJECTIVES

- \ Name the three groups of input devices.
- \ Describe the function of the input element of a control circuit.
- \ Describe the function of the logic element of a control circuit.
- \ Describe the function of the output element of a control circuit.
- \ Describe the state in which symbols are drawn on electrical schematics.

## ELECTRICAL SCHEMATIC SYMBOLS - INPUT DEVICES (2ESC)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Electrical Print Reading Library. The lesson presents the symbols for various manually and process actuated input devices and how they are represented on an electrical schematic.

### MODULE OBJECTIVES

- \ Identify the symbols for various manually operated input devices.
- \ Explain how various manually operated input devices are used.
- \ Identify symbols for various process actuated input devices.
- \ Explain how various process actuated input devices are used.
- \ Given an electrical schematic, identify a process actuated device.
- \ Identify symbols for two-position actuated input devices.
- \ Explain how and two-position actuated input devices are used.

## ELECTRICAL SCHEMATIC SYMBOLS - LOGIC AND OUTPUT DEVICES (3ESC)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Electrical Print Reading Library. This lesson defines the function of logic and output elements of a control circuit and presents the symbols for various logic and output devices.

### MODULE OBJECTIVES

- \ Describe the function of the logic element and the output element of a control circuit.
- \ Identify the symbol for a relay and the associated contacts.
- \ Identify various logic symbols and state how they are used.
- \ Identify the symbol for a motor starter and state how it is used.

## INTERPRETING ELECTRICAL SCHEMATICS (4ESC)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fourth lesson in the Electrical Print Reading Library. This lesson describes the steps for interpreting the relationships among the input, logic, and output components of an electrical schematic.

### MODULE OBJECTIVES

- \ List and define the two basic parts of an electrical schematic.
- \ Describe the layout of a typical electrical schematic.
- \ List and describe various conventions for labeling schematics.
- \ Describe the steps for interpreting schematics.
- \ Given a device in an electrical schematic, state the function of that device.
- \ Given a rung in an electrical schematic, interpret the function of that rung.
- \ Interpret an electrical schematic.

## INTRODUCTION TO ELECTRICAL DIAGRAMS (IED)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fifth lesson in the Electrical Print Reading Library, and the first lesson covering electrical diagrams. This lesson presents information about the purpose of various types of electrical diagrams and how to interpret the information in the title block. It also explains how to make electrical drawing revisions.

### MODULE OBJECTIVES

- \ Explain the purpose and types of electrical drawings.
- \ Describe the layouts of electrical diagrams.
- \ Explain the information given in a title block in an electrical diagram.
- \ Explain how to make electrical drawing revisions.

## BUILDING ELECTRICAL DIAGRAMS (BED)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the Electrical Print Reading Library. This lesson presents the different views used in electrical diagrams as well as how to identify components, cables, and conduits. The cable chart is also presented.

### MODULE OBJECTIVES

- \ Describe the floor plan view of an electrical diagram.
- \ Describe the elevation view of an electrical diagram.
- \ Identify components in a building electrical diagram.
- \ Identify cables and conduits in a building electric diagram.
- \ Identify the cable chart in a building electrical diagram.

## SINGLE-LINE ELECTRICAL DIAGRAMS (SLED)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the Electrical Print Reading Library. This lesson presents information regarding how to identify loads, equipment, and isolation breakers on a single-line electrical diagram.

### MODULE OBJECTIVES

- \ Explain the purpose of single-line diagrams.
- \ Identify voltage conventions in a single-line diagram.
- \ Identify symbology in a single-line diagram.
- \ Identify loads in a single-line diagram.
- \ Identify isolation breakers in a single-line diagram.

## WIRING DIAGRAMS (WIRD)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Electrical Print Reading Library. The lesson presents information how to identify components, equipment, wires and cables on a wiring diagram. It also explains how to relate a wiring diagram to the installed hardware and how to use diagrams for maintenance and troubleshooting problems.

### MODULE OBJECTIVES

- \ Identify components and terminal conventions in a wiring diagram.
- \ Identify wiring conventions and interpret bundles in a wiring diagram.
- \ Relate the wiring diagram to actual hardware and actual wires.
- \ Troubleshoot a circuit using wiring diagram.

## **ELECTRICAL SAFETY LIBRARY (ES)**

LENGTH: 16 Hours CEU: 1.6 Credits LANGUAGES: EN

### OVERVIEW

This library consists of eight lessons. The lessons in this library were designed to provide training for electricians, mechanics, and others working with or around electricity. The lessons in this library provide an understanding of electricity focused on increased awareness and prevention of industrial accidents.



## **WORKING SAFELY WITH ELECTRICITY (WSE)**

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Electrical Safety Library. This lesson forms the foundation for the other lessons in Electrical Safety Library. The lesson explains safe work habits and basic safety rules that should be used when working around electricity. The importance of safely using circuits, the dangers of static electricity and the methods used to control it, is discussed. The use of fire extinguishers and how to identify the correct type of fire extinguisher to use on an electrical fire is also presented.

### MODULE OBJECTIVES

- \ Describe the need to make electrical safety habits second-nature.
- \ Describe the safe loading of circuits and basic rules when working around electricity.
- \ Describe the dangers of static electricity and methods for controlling static electricity.
- \ Identify the correct type of fire extinguisher to use on an electrical fire.

## **ELECTRICAL CIRCUITS AND SUPPLIES (ECS)**

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the second lesson in the Electrical Safety Library. This lesson explains the relationship between voltage, current and resistance. It also demonstrates the correct method for selecting, inspecting, and handling extension cords and portable electric hand tools, and the purpose of ground fault interrupters is explained.

### MODULE OBJECTIVES

- \ Describe how voltage, current, and resistance are related.
- \ Identify safety considerations when using an extension cord.
- \ Select the correct extension cord by rating.
- \ Demonstrate the correct method of inspecting and handling extension cords.
- \ Identify the proper procedure for inspecting portable electric hand tools.
- \ Define the purpose of a Ground Fault Interrupter (GFI).

## ELECTRICAL SHOCK (ELS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The third lesson in the Electrical Safety Library describes the effects electrical current has on the human body. Proper methods of removing a victim from an energized circuit are discussed. Who is “qualified” to perform a particular task and alerting techniques are introduced.

### MODULE OBJECTIVES

- \ Describe how accidental electric shock can occur.
- \ Describe the affects various amounts of current have on the human body.
- \ Identify the factors that influence body resistance to electric shock.
- \ Describe how various current paths through the body affect the severity of electric shock.
- \ Identify alerting techniques warning of electrical hazards.
- \ Describe the need to lock and tag a de-energized circuit before working on the circuit.
- \ Describe who is ‘Qualified’ according to OSHA.

## ELECTRICAL PERSON PROTECTIVE EQUIPMENT (EPPE)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fourth lesson in the Electrical Safety Library. This lesson defines personal protective equipment. The need for various alerting techniques, barriers, and attendants, and their roles is discussed, as well as the importance of following safe work habits. In addition, the lesson reinforces the requirements for being “qualified” for a particular task introduced in lesson 3, Electrical Shock.

### MODULE OBJECTIVES

- \ Define PPE and follow safe work habits; Identify and use alerting techniques.
- \ Properly use barriers.
- \ Identify the need for an attendant and the requirements for being ‘Qualified’.

## PROTECTIVE GLOVES AND SLEEVES (PGS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The fifth lesson in the Electrical Safety Library discusses the types and classes of protective gloves and sleeves used when working around electricity. The lesson identifies the proper practices for inspecting, repairing, wearing, and maintaining gloves and sleeves.

### MODULE OBJECTIVES

- \ Describe hazards for which gloves should be worn and factors to consider when selecting gloves.
- \ Identify proper practices for inspecting gloves and sleeves prior to use.
- \ Identify proper practices for repairing gloves and sleeves.
- \ Identify proper practices for wear and care of gloves and sleeves.

## EYE AND FACE PROTECTION (EFP)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the Electrical Safety Library. This lesson explains the importance of eye and face protection, as well as the proper practices for its inspections, care, and wear.

### MODULE OBJECTIVES

- \ Identify approved protective eyewear and types of hazards for which it offers protection.
- \ Identify proper practices for putting on and taking off protective eyewear.
- \ Identify proper practices for inspecting protective eyewear.
- \ Identify proper practices for caring for protective eyewear.

## PROTECTIVE HELMETS (PHEL)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the Electrical Safety Library. This lesson explains the protection provided by helmets, and the proper methods of inspection, wearing, and maintaining a helmet.

### MODULE OBJECTIVES

- \ Explain the protection provided by helmets.
- \ Identify the level of protection offered by Class A and Class B helmets.
- \ Identify proper methods for inspecting a helmet.
- \ Identify proper methods for wearing and maintaining a helmet.

## GENERAL PROTECTIVE EQUIPMENT (GPE)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eighth lesson in the Electrical Safety Library. This lesson presents information about safeguards, other than Personal Protective Equipment worn on the body, used when working with or around electricity. Inspection, repair, and care of general protective equipment, and proper use of this equipment are presented.

### MODULE OBJECTIVES

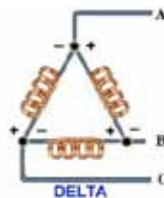
- \ Identify safeguards other than PPE worn on the body.
- \ Identify proper methods for using rubber insulating equipment.
- \ Identify proper uses of matting.
- \ Identify the safety features provided by insulating tools and how to use them properly.
- \ Identify proper methods for using fuse pullers.
- \ Identify proper methods for using barriers.
- \ Identify proper methods for using ropes and handlines.

## ELECTRICAL THEORY FOR TROUBLESHOOTERS LIBRARY (ETT)

LENGTH: 24 Hours CEU: 2.4 Credits LANGUAGES: EN

### OVERVIEW

This library consists of 12 interactive, on-line lessons. These lessons are excellent for the training of electricians and electronic technicians as well as for the multi-craft training needs of process and manufacturing facilities. The first four lessons in this library cover basic electrical concepts including Ohm's Law and Kirchhoff's Law, as well as the use of these laws to determine voltage, current, and resistance in series and parallel circuits.



## INTRODUCTION TO ELECTRICITY (1ETT)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Electrical Theory for Troubleshooters Library. This lesson uses animation to demonstrate atomic structure, electricity, and how a simple circuit operates. The lesson also explains the characteristics of good conductors and insulators.

### MODULE OBJECTIVES

- \ Describe the atomic structure of matter.
- \ Describe the characteristics of good conductors and insulators.
- \ Define electricity.
- \ Describe how a simple circuit operates.

## BASIC ELECTRICAL PROPERTIES (2ETT)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the second lesson in the Electrical Theory for Troubleshooters Library. This lesson covers Ohm's Law, as well as the use of Ohm's Law to calculate an unknown value. The lesson also defines voltage, current, resistance, and power.

### MODULE OBJECTIVES

- \ Define voltage, current, and resistance.
- \ Describe voltage and current relationships.
- \ State Ohm's Law.
- \ Use Ohm's Law to calculate an unknown value.
- \ Define power and how to use power values with Ohm's Law.

## SERIES CIRCUITS (3ETT)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the third lesson in the Electrical Theory for Troubleshooters Library. The lesson presents the operation of a series circuit and trains participants in the identification of simple schematic symbols used to represent components in a series circuit. The behavior of current, resistance, and current in a series circuit, and the use of Kirchhoff's Voltage Law to find total voltage are also covered.



### **MODULE OBJECTIVES**

- \ Define a series circuit.
- \ Properly identify simple schematic symbols for a battery, switch, lamp, resistor, and conductor.
- \ Describe how current and resistance behave in a series circuit.
- \ Describe how voltage behaves in a series circuit.
- \ Use Kirchoff's Voltage Law to find total voltage in a series circuit.

## **PARALLEL CIRCUITS (4ETT)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the fourth lesson in the Electrical Theory for Troubleshooters Library. This lesson describes the behavior of voltage, current, and resistance in a parallel circuit. The learner is also instructed in the identification of the series and parallel portions of a series-parallel circuit.

### **MODULE OBJECTIVES**

- \ Describe how voltage, current, and resistance behave in a parallel circuit.
- \ Identify the series portions of a series-parallel circuit.
- \ Identify the parallel portions of a series-parallel circuit.
- \ Simplify a series-parallel circuit to determine how voltage, current and resistance behave.

## **ALTERNATING CURRENT (5ETT)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the fifth lesson in the Electrical Theory for Troubleshooters Library. This lesson teaches the basic AC characteristics of voltage, including how voltage changes over time. The participant is also instructed in using sine waves to interpret the frequency of AC voltage.

### **MODULE OBJECTIVES**

- \ State the basic operating AC Characteristics of voltage.
- \ Explain how AC voltage changes over time.
- \ Define sine wave and cycle.
- \ Interpret the frequency of AC voltage using a sine wave.
- \ Explain RMS voltage vs. peak voltage.

## **ELECTROMAGNETISM (6ETT)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This sixth lesson in the Electrical Theory for Troubleshooters Library uses animations and demonstrations to explain the principles of magnetism, including flux density and electromagnetic induction. The lesson also shows how to plot a sine wave using a graph.

### **MODULE OBJECTIVES**

- \ Describe the principles of magnetism.
- \ Describe flux and flux density.
- \ Describe how electromagnetic induction takes place.
- \ Describe how a magnetic field is generated by passing current through a conductor.
- \ Plot a sine wave using a graph.

## INDUCTANCE (7ETT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the Electrical Theory for Troubleshooters Library. This lesson builds on the information presented in the lesson, Electromagnetism. Types of induction, phase, and the effect of induction in AC circuits are covered.

### MODULE OBJECTIVES

- \ Describe how a magnetic field is generated by passing current through a conductor.
- \ Explain self-induction.
- \ Explain counter-electromagnetic field.
- \ Describe how current is induced in a coil-type conductor.
- \ Explain mutual induction.
- \ Explain the principle of transformer function.
- \ Explain the function of a tap in transformer construction.
- \ Describe the effect of inductance in AC circuits.

## CAPACITANCE (8ETT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eighth lesson in the Electrical Theory for Troubleshooters Library. This lesson explains capacitors, their function, and how capacitance affects AC circuits.

### MODULE OBJECTIVES

- \ Define capacitance and identify its schematic symbol.
- \ Explain how a capacitor becomes charged and discharged.
- \ Explain how capacitance affects AC circuits.

## THREE-PHASE CIRCUITS (9ETT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the ninth lesson in the Electrical Theory for Troubleshooters Library. This lesson defines 3-phase AC, describes the components and operating principle of 3-phase generators, and using the formula for frequency, shows how rotor speed and the number of poles is related to frequency.

### MODULE OBJECTIVES

- \ Define 3-phase AC and differentiate between 3-phase and 1-phase AC.
- \ Describe the components and operating principle of a 3-phase generator.
- \ Use a sine wave to show how 3-phase voltage changes over time.
- \ Explain the relationship between frequency and rotor speed.
- \ State and apply the formula for frequency.
- \ Describe how rotor speed and the number of poles relate to frequency.

## WYE AND DELTA CONNECTIONS (10ETT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The tenth lesson in the Electrical Theory for Troubleshooters Library, this lesson discusses Wye and Delta configurations and explains the relationship between phase and line voltages in various connections, and demonstrates the application of the formula that shows this relationship.

### MODULE OBJECTIVES

- \ Describe the relationship between phase and line voltages in a 3-wire wye connection.
- \ Describe the relationship between phase and line voltages in a 4-wire wye connection.
- \ Describe the relationship between phase and line currents in a delta connection.
- \ Calculate power in a 3-phase load.
- \ Describe the relationship between phase and line voltages in a delta connection.

## **INTRODUCTION TO TRANSFORMERS (11ETT)**

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The eleventh lesson in the Electrical Theory for Troubleshooters Library, this lesson presents the basic parts of a transformer and their function. The lesson explains turns ratio and its relationship to a transformer's input and output voltages.

### MODULE OBJECTIVES

- \ Identify and describe the functions of the basic transformer parts.
- \ Explain relationship between a transformer's turns ratio and input and output voltages.
- \ Describe the danger in reversing or stepping-up the voltage.

## **TRANSFORMERS (12ETT)**

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Electrical Theory for Troubleshooters Library. This lesson builds on the information presented in the lesson, Introduction to Transformers. How to determine primary current and voltage, secondary current and voltage, and load is taught.

### MODULE OBJECTIVES

- \ Given the secondary voltage and load, determine the primary current.
- \ Given the primary voltage and load, determine the secondary current.
- \ Given the turns ratio and voltage and current from either the primary or secondary, determine the power.
- \ Given power and primary voltage, determine primary current.
- \ Given primary voltage, determine secondary voltage in a 3-phase transformer.
- \ Describe the configuration of a 3-phase transformer.
- \ State some applications and maintenance precautions for a 3-phase transformer.
- \ Explain the functions and uses of multi-tap transformer and autotransformers.

## **LIMIT SWITCHES (LS)**

LENGTH: 8 Hours      CEU: 0.8 Credits      LANGUAGES: EN

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### OVERVIEW

This library consists of four lessons designed to provide training for the multi-craft training needs of process and manufacturing facilities. Topics include purpose and function, types of limit switches, safety considerations, and replacement compatibility. Additional topics include possible malfunctions, maintenance and troubleshooting, solid state, torque and geared, and lever-actuated switches.



## OVERVIEW (1LS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Limit Switches Library. This lesson describes limit switches, how they work, how to recognize them, and typical applications in which they are used.

### MODULE OBJECTIVES

- \ Define the purpose, function, and types of limit switches.
- \ Explain and visually identify each of the limit switches.
- \ Describe safety considerations when working with limit switches.
- \ Know how to ensure that a replacement switch will work correctly.

## LEVER-ACTUATED (2LS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Limit Switches Library. This lesson describes limit switches, how they work, how to recognize them, and typical applications they are used in.

### MODULE OBJECTIVES

- \ Describe the internal function of a lever-actuated limit switch and its function in a control circuit.
- \ Maintain, troubleshoot, repair, and adjust a lever-actuated limit switch.
- \ Describe the possible malfunctions of a lever-actuated limit switch.

## SOLID STATE (3LS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Limit Switches Library. This lesson describes solid state limit switches, how they work, how to recognize them, and typical applications in which they are used.

### MODULE OBJECTIVES

- \ Describe the function of solid state limit switches.
- \ Maintain, troubleshoot, repair, and adjust solid state limit switches.
- \ Describe the possible malfunctions of solid state limit switches.

## TORQUE AND GEARED (4LS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Limit Switches Library. This lesson describes geared limit switches and torque switches. This lesson also discusses maintenance, troubleshooting, and adjustment requirements for these switches.

### MODULE OBJECTIVES

- \ Explain the internal function of a geared limit switch and torque switch in a control circuit.
- \ Maintain, troubleshoot, repair, and adjust solid state limit switches.
- \ Describe the possible malfunctions of a geared limit switch and torque switch.
- \ Troubleshoot, maintain and repair these switches.

## MULTIMETERS LIBRARY (MUL)

LENGTH: 10 Hours CEU: 1.0 Credits LANGUAGES: EN

### OVERVIEW

This library consists of five lessons designed to provide training for persons working with electrical or electronic test equipment. These lessons demonstrate and explain how to use both a digital and an analog multimeter. During these lessons, voltage, resistance, current, capacitance, and frequency are measured. The final lesson also describes some of the more common features of a digital multimeter.



## DIGITAL MULTIMETERS (1MM)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Multimeters Library. The lesson presents the types of multimeters. The lesson describes the display area, function switch, and leads and jacks on a digital multimeter.

### MODULE OBJECTIVES

- \ Identify and describe the display area of a digital multimeter.
- \ Identify and describe the function switch on a digital multimeter.
- \ Identify and describe the leads/jacks on a digital multimeter.

## ANALOG MULTIMETERS (2MM)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the second lesson in the Multimeters Library. This lesson demonstrates various aspects of an analog multimeter, including how to adjust mechanical zero, how to interpret a reading on the voltage and resistance scales, and how to set the function and range switches.

### MODULE OBJECTIVES

- \ Adjust the mechanical zero of an analog multimeter.
- \ Interpret a reading on the voltage scale of an analog multimeter.
- \ Interpret a reading on the resistance scale of an analog multimeter.
- \ Given an expected measurement, set the function and range switches of an analog multimeter.
- \ Adjust the zero on the ohms scale of an analog multimeter.

## MULTIMETER SELECTION AND INSPECTION (3MM)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the third lesson in the Multimeters Library. This lesson trains the learner in the inspection of a multimeter, the steps that should be taken before using a multimeter, and how to perform a continuity check.

### MODULE OBJECTIVES

- \ Identify the steps in inspecting a multimeter.
- \ List the steps you should take before using a multimeter.
- \ Define continuity and perform a continuity check.

## USING MULTIMETERS (4MM)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the fourth lesson in the Multimeters Library. This lesson trains the learner to use a multimeter to measure resistance, AC voltage, DC voltage, current, frequency, and capacitance.

### MODULE OBJECTIVES

- \ Use a multimeter to measure resistance.
- \ Measure AC voltage using a multimeter.
- \ Measure DC voltage using a multimeter.
- \ Use a multimeter to measure current.
- \ Use a multimeter to measure frequency.
- \ Use a multimeter to measure capacitance.

## ADVANCED FEATURES OF DIGITAL MULTIMETERS (5MM)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

The final lesson in the Multimeters Library, this lesson instructs the participant in the use of the advanced features of digital multimeters.

### MODULE OBJECTIVES

- \ Describe and use the hold button on a digital multimeter.
- \ Describe and use the relative button on a digital multimeter.
- \ Describe and use the range button on a digital multimeter.
- \ Describe and use the min/max button on a digital multimeter.
- \ Explain when the shift button is used.

## OSCILLOSCOPES LIBRARY (OSC)

LENGTH: 18 Hours CEU: 1.8 Credits LANGUAGES: EN

### OVERVIEW

This library contains nine lessons designed for the training of electricians and electronic technicians as well as for the multi-craft training needs of process and manufacturing facilities. These lessons are designed for participants familiar with AC and DC theory, electrical safety, and electrical print reading. A basic understanding of electronic devices and circuits is recommended. The lessons in this library explain and demonstrate the use of both analog and digital oscilloscopes. Participants will learn the controls on each type of oscilloscope, how to use a probe with an oscilloscope, how to set up an oscilloscope, and how to determine various measurements taken with an oscilloscope.



## INTRODUCTION TO OSCILLOSCOPES (10SC)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Oscilloscopes Library. This lesson explains the purpose of oscilloscopes, introduces waveforms, and presents analog and digital oscilloscope systems using a flowchart.

### **MODULE OBJECTIVES**

- \ Define the purpose and uses of an oscilloscope.
- \ Explain the vertical and horizontal axes of a waveform represent.
- \ List what can be learned about a signal from a waveform.
- \ Recognize the positive and negative peaks on a waveform.

## **THE DISPLAY (20SC)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the second lesson in the Oscilloscopes Library. This lesson explains the functions of the display and display controls on an analog and digital oscilloscope. The lesson also explains how divisions are used.

### **MODULE OBJECTIVES**

- \ Explain the functions of an analog oscilloscope's display controls.
- \ Explain the functions of a digital oscilloscope's display controls.
- \ Explain how divisions are used.

## **VERTICAL SYSTEM CONTROLS (30SC)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the third lesson in the Oscilloscopes Library. This lesson explains the vertical system controls on analog and digital oscilloscopes.

### **MODULE OBJECTIVES**

- \ Explain the function of the oscilloscope vertical controls.
- \ Explain the vertical system controls of an analog oscilloscope.
- \ Explain the vertical system controls of a digital oscilloscope.

## **HORIZONTAL SYSTEM CONTROLS (40SC)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the fourth lesson in the Oscilloscopes Library. This lesson explains the horizontal system controls on analog and digital oscilloscopes.

### **MODULE OBJECTIVES**

- \ Explain the function of an oscilloscope's horizontal system and controls.
- \ Explain the function of digital and an analog oscilloscope's horizontal system controls.

## **THE TRIGGER SYSTEM (50SC)**

**LENGTH:** 2 Hours      **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the fifth lesson in the Oscilloscopes Library. This lesson explains the functions and controls of the trigger system on analog and digital oscilloscopes.

### **MODULE OBJECTIVES**

- \ Describe the function of an oscilloscope's trigger system.
- \ Describe the controls of an oscilloscope's trigger system.

## PROBES (6OSC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the Oscilloscopes Library. This lesson explains the purpose and use of probes, and trains the participant to match the probe/scope combination to the application.

### MODULE OBJECTIVES

- \ Explain the reason for probe compensation.
- \ Describe other common probe types.
- \ Describe the applications of common probe types.
- \ Match a probe/scope combination to the application.

## SETUP (7OSC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the Oscilloscopes Library. This lesson trains the participant to safely setup an oscilloscope for use, how to adjust the controls, and compensate the probe.

### MODULE OBJECTIVES

- \ Describe the safety rules related to using an oscilloscope.
- \ Adjust the display controls on an oscilloscope.
- \ Adjust the trigger controls to display a given waveform.
- \ Adjust the vertical and horizontal controls to display a given waveform.

## WAVEFORMS (8OSC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eighth lesson in the Oscilloscopes Library. This lesson teaches participants to recognize the various waveform types and how to analyze waveforms.

### MODULE OBJECTIVES

- \ Identify the following waveforms: sine, square, rectangular, sawtooth, and triangle.
- \ Identify a pulse and step signal.
- \ Identify a complex waveforms.
- \ Explain what factors influence differences between source documentation of signals

## MEASUREMENT (9OSC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Oscilloscopes Library. This lesson teaches how to determine various measurements taken with an oscilloscope. Topics include voltage, Period and Frequency, Rise time, Pulse Width, and Phase Shift.

### MODULE OBJECTIVES

- \ Measure voltage using a waveform.
- \ Measure the period and frequency of a waveform.
- \ Define pulse rise time and pulse width.
- \ Measure rise time.
- \ Measure pulse width.
- \ Measure phase shift.



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## **MECHANICAL SKILLS**

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Mechanical Skills Library, a series of nine courses, comprises a diverse array of mechanical equipment and components found on oilrigs, offshore platforms or other industrial settings. To keep an industrial facility running requires mechanics and maintenance personnel with a wide range of tools and skills at their disposal. Using hand tools, reading mechanical prints, taking precise measurements and proper operation of industrial hydraulic power systems are skills necessary in many commercial settings. Knowing how to analyze or repair bearings, pumps, seals and valves keeps operations moving in any heavy industry.

## BEARINGS (BRG)

LENGTH: 6 Hours CEU: 0.6 Credits LANGUAGES: EN

### OVERVIEW

This library consists of three lessons designed for the training of bearings. Topics covered include the importance of bearings in machinery operation, concept of load and how it affects bearings, and housings. Additionally, the main types of bearing are discussed: plain, anti-friction, and thrust bearings.



Anti-friction bearing

## INTRODUCTION TO BEARINGS (1BRG)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This lesson was designed for employees in all disciplines as well as for the multi-craft training needs of process and manufacturing facilities. The lesson describes the purpose and the basic components of bearings. The lesson also introduces the identification and proper usage of bearing types.

### MODULE OBJECTIVES

- \ Describe bearings and their importance in machinery operation.
- \ Introduce the concept of load and how it effects bearings.
- \ Explain the purpose of housings.
- \ Explain the use of PLAIN bearings.
- \ Explain the use of ANTI-FRICTION bearings.
- \ Explain the use of THRUST bearings.

## ANALYZING BEARING FAILURE (2BRG)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This lesson explains the purpose of bearings and demonstrates how bearings reduce friction and maintain the alignment of operating equipment. The basic operation of anti-friction bearings and plain journal bearings is demonstrated as well as the importance of full fluid film lubrication and proper lubrication clearance. Additionally, indications of various premature bearing failures are discussed.

### MODULE OBJECTIVES

- \ Dismount anti-friction bearings using a bearing press and/or a bearing puller
- \ Inspect the bearing for signs of failure
- \ Clean the shaft and check for taper and out-of-round using the proper measuring instruments
- \ Clean the housing and check for damage
- \ Select the proper bearing for replacement, if necessary
- \ Properly orient a bearing prior to installation
- \ Mount a bearing using an induction heater and/or an arbor press
- \ Measure the bearing's inner and outer clearances during installation
- \ Properly lubricate bearings per manufacturers' recommendations

## MAINTAINING BEARINGS: REDUCING FAILURE RATE (3BRG)

LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This lesson explains and demonstrates how to clean and disassemble bearing housings and how to dismount, inspect, and mount common types of bearings. The importance of cleanliness and following manufacturers' instructions are stressed throughout each demonstrated procedure.

### MODULE OBJECTIVES

- \ Dismount anti-friction bearings using a bearing press and/or a bearing puller
- \ Inspect the bearing for signs of failure
- \ Clean the shaft and check for taper and out-of-round using the proper measuring instruments
- \ Clean the housing and check for damage
- \ Select the proper bearing for replacement, if necessary
- \ Properly orient a bearing prior to installation
- \ Mount a bearing using an induction heater and/or an arbor press
- \ Measure the bearing's inner and outer clearances during installation
- \ Properly lubricate bearings per manufacturers recommendations

## CENTRIFUGAL PUMP REPAIR (CP)

LENGTH: 12 Hours CEU: 1.2 Credits LANGUAGES: EN

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### OVERVIEW

This library is designed for all levels of maintenance personnel as well as for the multicraft training needs of process and manufacturing facilities. Participants should be familiar with the basic operation of centrifugal pumps. This library consists of six modules covering excessive leakage, temperature, loss of capacity, disassembly, inspection, and reassembly.



## TROUBLESHOOTING EXCESSIVE LEAKAGE (1CP)

LENGTH: 2 Hours CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Centrifugal Pump Repair Library. This lesson introduces the components and operating principles of a typical centrifugal pump. Normal operating conditions for the pump are described and guidelines for troubleshooting excessive leakage are provided.

### MODULE OBJECTIVES

- \ Identify and describe the sealing surfaces on a centrifugal pump.
- \ Explain the purpose and conditions under which packing would be used.
- \ Explain the purpose of the lantern ring.
- \ Explain the purpose and conditions under which a mechanical seal would be used.
- \ Explain how to determine whether centrifugal pump leakage is excessive.
- \ Recognize causes and symptoms of excessive leakage.

## TROUBLESHOOTING EXCESSIVE TEMPERATURE (2CP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Centrifugal Pump Repair Library. This lesson introduces the components and operating principles of a typical centrifugal pump. Normal operating conditions for the pump are described and guidelines for troubleshooting excessive temperature are provided.

### MODULE OBJECTIVES

- \ Explain the purpose of bearings in a centrifugal pump.
- \ Explain how normal operating temperature is maintained in a centrifugal pump.
- \ Recognize causes of symptoms of excessive temperature in a centrifugal pump.
- \ Discuss causes of symptoms of excessive temperature in a centrifugal pump.

## TROUBLESHOOTING LOSS OF CAPACITY (3CP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Centrifugal Pump Repair Library. This lesson introduces the components and operating principles of a typical centrifugal pump. Normal operating conditions for the pump are described and guidelines for troubleshooting loss of capacity/loss of head are provided.

### MODULE OBJECTIVES

- \ Explain how pressure and flow rate are affected by the system in which a pump operates.
- \ Recognize and discuss causes of symptoms of loss of capacity/loss of head.
- \ Explain what occurs during cavitation.
- \ Explain the causes and symptoms of worn components.

## DISASSEMBLY (4CP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fourth lesson in the Centrifugal Pump Repair Library. This lesson demonstrates how to disassemble a typical end-suction pump. The locations and functions of pump components are described as well.

### MODULE OBJECTIVES

- \ Identify main components of a typical end suction pump.
- \ Explain the function of the components of a typical end suction pump.
- \ List and demonstrate the preparation for pump disassembly.
- \ Disassemble a typical end suction pump.

## INSPECTION (5CP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fifth lesson in the Centrifugal Pump Repair Library. This lesson demonstrates how to inspect a typical end-suction pump. The procedures for measuring and inspecting pump parts, and the steps for checking impeller clearance are described.

### MODULE OBJECTIVES

- \ Inspect the components of a centrifugal pump.
- \ Measure the bearing seat on the shaft of a centrifugal pump.
- \ Measure shaft runout.
- \ Recognize evidence of cavitation on an impeller.
- \ Explain the importance noting measurements in a maintenance log.

## REASSEMBLY (6CP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Centrifugal Pump Repair Library. This lesson demonstrates how to reassemble a typical end-suction pump. General guidelines for installing a mechanical seal are also provided.

### MODULE OBJECTIVES

- \ Reassemble a typical end suction pump.
- \ Check impeller clearance.
- \ Calculate the thickness of shims needed to correct impeller clearance.
- \ Determine the gasket size needed in the bearing end cap.
- \ Install a mechanical seal.

## HAND TOOLS (HT)

LENGTH: 8 Hours      CEU: 0.8 Credits      LANGUAGES: EN

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### OVERVIEW

This library consists of four lessons. This library is designed for employees in all disciplines as well as for the multi-craft training needs of process and manufacturing facilities. Upon completion of this lesson, participants will be able to improve their on-the-job performance through the proper use hand tools.



## CLAMPS, VISES, AND PLIERS (1HT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Hand Tools Library. This lesson introduces and demonstrates the proper use of tools used for holding.

### MODULE OBJECTIVES

- \ Describe three types of vises and explain when each type should be used.
- \ Identify the basic components of a machinist's vise.
- \ Explain how to use a c-clamp to hold an object.
- \ Explain how to choose the right size c-clamp needed for a job.
- \ Describe four types of pliers and explain how they are used.
- \ List four things that should be done before using any tool.

## SCREWDRIVERS (2HT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Hand Tools Library. This lesson introduces and demonstrates the proper use of screwdrivers.

### MODULE OBJECTIVES

- \ Identify three types of screwdrivers.
- \ Explain when each of the above three screwdrivers should be used.
- \ Describe the damage that may be caused to a screw if the wrong size is used.
- \ Demonstrate the proper technique for inserting and removing a screw.

## WRENCHES (3HT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Hand Tools Library. This lesson introduces and demonstrates the proper use of wrenches.

### MODULE OBJECTIVES

- \ Describe three basic types of nonadjustable wrenches and identify when each should be used.
- \ Identify the components of a socket wrench set.
- \ Assemble a socket wrench and use it to remove a bolt.
- \ Identify and describe how three types of torque wrenches are used.
- \ Assemble and use a deflecting beam torque wrench
- \ Identify and describe three types of adjustable wrenches.

## HAMMERS, MALLETS, AND SLEDGES (4HT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Hand Tools Library. This lesson introduces and demonstrates the proper use of tools used for striking.

### MODULE OBJECTIVES

- \ Describe five types of hammers and the differences between hammers, mallets, and sledges.
- \ Explain what parts of a hammer should be inspected.
- \ Discuss in what situation the hammers in this lesson should be used.
- \ Discuss general guidelines for using a hammer correctly.

## INDUSTRIAL HYDRAULIC POWER (IHP)

LENGTH: 26 Hours      CEU: 2.6 Credits      LANGUAGES: EN

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### OVERVIEW

This library consists of thirteen lessons. These lessons were designed for beginning hydraulic technicians as well as mechanics, electricians, operators, and for those individuals who need to learn more about industrial hydraulic power. The lessons in this library train participants to identify system components, read schematics, and understand the conditions necessary for proper operation of a hydraulic system.



## INTRODUCTION TO HYDRAULIC SYSTEMS (HIS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Industrial Hydraulic Power Library. This lesson identifies the basic components of an industrial hydraulic system and explains their functions. Formulas, including Pascal's Law, are presented and their use in determining values in a hydraulic system is explained.

### MODULE OBJECTIVES

- \ Visually identify the basic components of an industrial hydraulic system.
- \ Describe the function of the basic components of an industrial hydraulic system.
- \ Understand Pascal's Law
- \ Describe the transmission of power
- \ Describe conditions necessary for normal operation of a pressure relief valve.
- \ Describe the conversion of power through the hydraulic system.
- \ Calculate electrical horsepower and piston speed, given the appropriate variables.

## HYDRAULIC SCHEMATICS (HS)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Industrial Hydraulic Power Library. This lesson introduces the schematic symbols that represent the basic components of a hydraulic system. It explains the use of color-coding used to identify pressure and how to identify the flow path through the system using schematics.

### MODULE OBJECTIVES

- \ Identify the schematic symbols for the basic components of a hydraulic system.
- \ Identify the pressure at a given point in a hydraulic system using color-coding.
- \ Identify the flow path through a simple hydraulic system, given a schematic for a simple hydraulic system.

## HYDRAULIC FLUIDS (HF)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Industrial Hydraulic Power Library. The lesson discusses the types, properties, and functions of hydraulic fluids and the components in which they are used.

### MODULE OBJECTIVES

- \ Describe types, properties, and functions of hydraulic fluid
- \ List sources of fluid contamination and ways to avoid contamination.
- \ List the purposes of a hydraulic reservoir.
- \ Identify the components of a hydraulic reservoir and describe their functions.
- \ Describe the conditions necessary for proper functioning of a hydraulic reservoir.
- \ Describe the purposes of hydraulic filters.
- \ Describe the functions of hydraulic piping.

## HYDRAULIC PUMP APPLICATIONS (HPA)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The fourth lesson in the Industrial Hydraulic Power Library, this lesson discusses the various hydraulic pumps and their applications. It also describes symptoms of pump malfunction.

### MODULE OBJECTIVES

- \ Describe the role of the pump in hydraulic power transmission given a system schematic.
- \ Calculate the actual flow rate and the volumetric efficiency in a hydraulic system.
- \ Explain the effect of the position of the reservoir in relation to the inlet side of the pump.
- \ Recognize symptoms of pump malfunction.

## POSITIVE DISPLACEMENT PUMPS (PDP)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the fifth lesson in the Industrial Hydraulic Power Library. This lesson describes various positive displacement pumps and their components. The lesson explains some of the causes of system inefficiencies associated with fixed volume pumps and describes applications in which variable volume pumps are used.

### MODULE OBJECTIVES

- \ Identify components of fixed and variable volume vane pumps, describe their functions.
- \ Identify components of bent axis and axial piston pumps, and describe their functions.
- \ Explain causes of system inefficiencies associated with fixed volume pumps.
- \ Describe applications for variable volume pumps.

## HYDRAULIC ACCUMULATORS (HACC)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the sixth lesson in the Industrial Hydraulic Power Library. This lesson describes the common accumulators and their schematic symbols. It also describes the application and operation of an accumulator in a hydraulic system. Safety considerations for depressurizing and pre-charging an accumulator are discussed.

### MODULE OBJECTIVES

- \ Identify and describe the application of an accumulator in a system.
- \ Identify common types of accumulators.
- \ Identify safety considerations for depressurizing and pre-charging an accumulator.
- \ Describe how an accumulator operates in a hydraulic system.

## PRESSURE CONTROL PRINCIPLES (PCP)

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LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the seventh lesson in the Industrial Hydraulic Power Library. This lesson describes the functions of a pressure relief valve in a hydraulic system and the conditions necessary for normal operation of a pressure relief valve. Pressure characteristics, the relationship of pressure and flow, and depressurization are also discussed.

### MODULE OBJECTIVES

- \ Describe the functions of a pressure relief valve in a hydraulic system



## PRESSURE CONTROL OPERATION (PCO)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The eighth lesson in the Industrial Hydraulic Power Library, this lesson presents various pressure control valves, their operation, and components.

### MODULE OBJECTIVES

- \ Explain the operation of a direct-acting poppet type pressure control valve.
- \ Explain the operation of a pilot operated pressure control valve.
- \ Explain the operation of a normally open pressure control valve.

## PRESSURE CONTROL VALVE APPLICATIONS (PCVA)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the ninth lesson in the Industrial Hydraulic Power Library. This lesson describes the proper operation of pressure control valves used in various applications.

### MODULE OBJECTIVES

- \ Describe how an unloading pressure control valve operates.
- \ Describe how a counterbalance valve operates.
- \ Describe the proper operation of a pressure control valve in a sequencing circuit.
- \ Describe the proper operation of a pressure control valve in a pressure reducing circuit.
- \ Describe the proper operation of a check valve.

## DIRECTIONAL CONTROL PRINCIPLES (DCP)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the tenth lesson in the Industrial Hydraulic Power Library. This lesson describes various directional control valves. The lesson explains the function of the ports on a directional control valve and instructs the process of tracing the various flow paths through the valve. The lesson also describes the centering conditions and piloting arrangements commonly used with directional control valves.

### MODULE OBJECTIVES

- \ Identify the schematic symbols for various types of directional control valves.
- \ Identify the functions of the ports on a directional control valve.
- \ Trace various flow paths through the directional control valve using a system schematic.
- \ Describe centering conditions commonly used in directional control valves.
- \ Describe piloting arrangements commonly used with directional control valves.

## FLOW CONTROL VALVES (FCV)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the eleventh lesson in the Industrial Hydraulic Power Library. The lesson demonstrates how to determine speed and flow rates and differential pressure. It describes various valves, their components, and their uses.

## **MODULE OBJECTIVES**

- \ Explain the conditions that affect flow in a hydraulic system using a system schematic.
- \ Identify the schematic symbols and functions of ports for flow control valves.
- \ Describe the operation of a needle valve, and trace the path of the fluid through the valve.
- \ Describe the operation of a check valve.
- \ Describe the operation of meter-in and meter-out circuits using a system schematic.

## **ACTUATOR CYLINDERS (ACY)**

**LENGTH:** 2 Hours    **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the twelfth lesson in the Industrial Hydraulic Power Library. This lesson describes the various cylinders used in hydraulic actuators. It also describes the operation of a cylinder controlled by regulating flow or pressure, and the purpose of a cylinder leak test.

### **MODULE OBJECTIVES**

- \ Describe the difference between a single-acting cylinder and a double-acting cylinder.
- \ Identify the schematic symbol and describe the action of a differential cylinder.
- \ Describe the operation of a circuit whose cylinder is controlled by regulating flow or pressure.
- \ Identify the components of a hydraulic cylinder using a cutaway model.
- \ Explain the purpose of a cylinder leak test.

## **HYDRAULIC MOTORS (HYM)**

**LENGTH:** 2 Hours    **CEU:** 0.2 Credits

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### **OVERVIEW**

This is the final lesson in the Industrial Hydraulic Power Library. General knowledge of hydraulic schematics is required. Review of the lesson, Hydraulic Schematics, is recommended. This lesson describes various hydraulic motors and their functions. It also describes the operation of various hydrostatic drive circuits and the function of components and flowpath in a braking circuit.

### **MODULE OBJECTIVES**

- \ Identify the schematic symbol for an unidirectional and bi-directional hydraulic motor.
- \ Describe the functional similarity between a hydraulic pump and a hydraulic motor.
- \ Describe the flow path through a hydraulic motor, using a cutaway diagram of a vane motor.
- \ Express the output of a hydraulic motor in terms of horsepower.
- \ Describe the operation of various hydrostatic drive circuits from the circuit schematics.
- \ Describe the function of the components and the flow path through the circuit.

## **INDUSTRIAL LUBRICATION (LUB)**

**LENGTH:** 8 Hours    **CEU:** 0.8 Credits    **LANGUAGES:** EN

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### **OVERVIEW**

This library consists of four lessons. This library is designed for training oilers, mechanics, and millwrights as well as for the multicraft needs of process and manufacturing facilities. Participants are trained to recognize various types of lubrication systems and their maintenance requirements, including ring, bath, splash, constant level, and forced feed lubrication systems, as well as understand how they operate. Participants also learn the importance of following lubrication schedules, how to change common types of oil filters, and how to properly handle and store lubricants to prevent lubricant contamination.



## INTRODUCTION TO INDUSTRIAL LUBRICATION (1LUB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Industrial Lubrication Library. This lesson explains the concept of lubrication and friction, and demonstrates the benefits of a proper lubrication program.

### MODULE OBJECTIVES

- \ Define lubrication and explain the benefits of a proper lubrication program.
- \ Define friction and identify factors that contribute to friction.
- \ Identify the three basic types of friction.
- \ Describe three types of lubrication applications used to reduce friction.

## LUBRICANTS (2LUB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Industrial Lubrication Library. This lesson explains viscosity as well as the properties of common solid, semi-solid, and liquid lubricants are described as well as the benefits associated with synthetic lubricants and the functions of additives and inhibitors. Common types and causes of lubricant contamination are described and proper methods of lubricant storage are demonstrated.

### MODULE OBJECTIVES

- \ Define viscosity.
- \ Describe three types of liquid lubricants and some typical applications.
- \ Describe the properties of liquid lubricants.
- \ Describe the properties and types of semi-solid lubricants and some typical applications.
- \ Describe types of solid lubricants and some typical applications.
- \ Describe the properties of solid lubricants.
- \ Identify some benefits of using synthetic lubricants.
- \ Explain the function of additives and inhibitors.
- \ Describe types and causes of lubricant contamination and how to prevent it.
- \ Describe proper methods of lubricant storage.

## LUBRICATION SYSTEMS (3LUB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Industrial Lubrication Library. This lesson trains participants to recognize various types of lubrication systems and their maintenance requirements, including ring, bath, splash, constant level, and forced feed lubrication systems, as well as understand how they operate.

### MODULE OBJECTIVES

- \ Explain how ring, bath, and splash lubrication systems operate.
- \ Explain how constant level lubrication systems operate.
- \ Perform a check on a natural feed lubrication system and determine machine condition.
- \ Describe how to add oil to a natural feed lubrication system.
- \ Describe the operation of forced feed lubrication systems.
- \ Explain the differences between natural feed and forced feed lubrication systems.
- \ Perform a check on a forced feed lubrication system and determine machine condition.
- \ Identify various devices used to apply lubrication manually.
- \ Describe how to apply the proper amount of grease to a bearing.

## FILTERS AND LUBRICATION MAINTENANCE (4LUB)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Industrial Lubrication Library. Participants also learn the importance of following lubrication schedules, how to change common types of oil filters. This lesson explains the purpose of filters and the importance of filter maintenance in lubrication systems. Additionally, the lesson indicates the benefits of oil sampling and analysis and identifies several factors, which can cause lubrication failure.

### MODULE OBJECTIVES

- \ Explain the purpose of filters in a lubrication system.
- \ Explain the differences between surface filters and depth-type filters.
- \ Explain why filter maintenance is important.
- \ Recognize indications that a filter must be cleaned or replaced.
- \ Explain the benefits of following a lubrication schedule.
- \ Interpret information on a lubrication schedule.
- \ Explain the benefits of oil sampling and analysis.

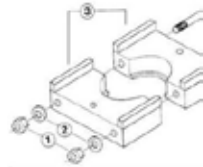
## MECHANICAL PRINT READING (MPR)

LENGTH: 8 Hours      CEU: 0.8 Credits      LANGUAGES: EN

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### OVERVIEW

This library consists of four lessons. This lesson was designed to provide training for maintenance technicians, mechanics, electricians, and others requiring knowledge of mechanical print reading. The lessons in this library show and explain how to read and interpret various mechanical drawings.



## INTRODUCTION TO MECHANICAL PRINT READING (1MPR)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Mechanical Print Reading Library. This introductory lesson trains the learner to identify the various parts of mechanical drawings and their components.

### MODULE OBJECTIVES

- \ Identify reasons for using drawings and blueprints.
- \ Recognize an assembly drawing and its components.
- \ Identify the parts of a Title Block.
- \ Recognize the different types of notes and their purpose.
- \ Recognize a detail drawing and its components.

## LINES USED IN MECHANICAL PRINT READING (2MPR)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Mechanical Print Reading Library. This lesson explains the types of lines used in mechanical print reading and what they represent.

### MODULE OBJECTIVES

- \ Identify visible lines and hidden lines and what they represent.
- \ Describe three uses for phantom lines.
- \ Describe three different break lines and their function.
- \ Recognize center, dimension, cutting plane, extension, section, and leader lines.

## **DIMENSIONS IN MECHANICAL PRINT READING (3MPR)**

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Mechanical Print Reading Library. This lesson explains the use of dimension and extension lines in mechanical print reading, and how to calculate dimensions, tolerance, and limits. The use of surface finish designations is also discussed.

### MODULE OBJECTIVES

- \ Recognize and define dimension lines.
- \ Recognize and define extension lines.
- \ Identify and measure dimensions on circular features.
- \ Use calculated dimensions.
- \ Demonstrate how calculated dimensions are used and why.
- \ Define and calculate tolerance.
- \ Define and calculate limits.
- \ Differentiate types of surface finish designations.

## **ORTHOGRAPHIC PROJECTION (4MPR)**

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Mechanical Print Reading Library. This lesson trains participants in the use of orthographic projections in mechanical print reading. Pictorial drawings and various views used in mechanical print reading are demonstrated.

### MODULE OBJECTIVES

- \ Define an orthographic projection.
- \ Identify the purpose of an orthographic projection.
- \ Relate orthographic views to projections.
- \ Relate how first and third angle projections are used.
- \ Describe what a third angle looks like.
- \ Identify the symbol for each angle in the title block.
- \ Define the three types, characteristics, and uses of pictorial drawings: isometric, oblique and perspective.
- \ Recognize sectional views and define why sectional views are used.
- \ Identify the four types of sections.
- \ Describe three ways to represent the threads of threaded fasteners.
- \ Identify thread designations.

## MECHANICAL SEALS LIBRARY (MS)

LENGTH: 8 Hours CEU: 0.8 Credits LANGUAGES: EN

### OVERVIEW

This library consists of four lessons designed for persons with a basic understanding of the operation and maintenance of pumps, agitators, and rotating equipment. The lessons in this library train participants to work effectively with mechanical seals. The functions, operation, and repair of common mechanical seals are demonstrated. The library presents specific procedures for failure analysis and identification, seal removal, disassembly, reassembly, and installation.



## INTRODUCTION TO MECHANICAL SEALS (1MEC)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Mechanical Seals Library. The lesson explains the purpose and basic components of mechanical seals. The participant is instructed in the identification and characteristics of materials commonly used to make seal faces and seal hardware, and to understand the limitations of seals. Characteristics, limitations, and application of packing are also discussed.

### MODULE OBJECTIVES

- \ Explain the purpose of mechanical seals.
- \ Identify the basic components of a mechanical seal.
- \ Identify the types of materials commonly used to make seal faces and elastomers.
- \ Describe the characteristics of materials commonly used to make seal faces.
- \ Identify the types of materials commonly used to make seal hardware.
- \ Describe the characteristics of materials commonly used to make seal hardware.
- \ Identify the primary sealing points of a mechanical seal.
- \ Identify the secondary sealing points of a mechanical seal.
- \ Identify the characteristics and limitations of mechanical seals.
- \ Describe the characteristics of packing.
- \ Identify applications in which packing is installed to control process leakage.
- \ Explain when packing should be replaced by a mechanical seal.

## MECHANICAL SEAL DESIGNS (2MEC)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the second lesson in the Mechanical Seals Library. It describes various seal designs and their application. The lesson also describes conditions that may affect mechanical seal performance.

### MODULE OBJECTIVES

- \ Describe a single seal and list its uses.
- \ Describe a double seal and list its uses.
- \ Describe a tandem seal and list its uses.
- \ Describe a cartridge seal and list its uses.
- \ Define an inside seal and explain its use.
- \ Define an outside seal and explain its use.
- \ Explain how process fluid affects mechanical seals.
- \ Explain how temperature affects mechanical seals.

## FAILURE ANALYSIS (3MEC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Mechanical Seals Library. This lesson demonstrates the steps necessary to prepare to remove, and to remove, a failed mechanical seal. The lesson trains the participant in failure analysis to determine the cause of seal failure and identify the means to correct the problem or condition that caused the failure.

### MODULE OBJECTIVES

- \ List the steps necessary to prepare for removing a failed mechanical seal.
- \ List the steps to removing a failed mechanical seal.
- \ Perform a failure analysis to determine the cause of seal failure.
- \ Identify the means to correct the problem or condition that caused seal failure.
- \ List the steps to follow to properly analyze seal failure.
- \ Describe seal damage caused by chemical attack.
- \ Describe seal damage caused by heat.
- \ Describe seal damage caused by mechanical action.

## MECHANICAL SEAL MAINTENANCE (4MEC)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The final lesson in the Mechanical Seals Library, trains the learner in seal disassembly and reassembly, O-ring installation, and seal installation.

### MODULE OBJECTIVES

- \ Remove a failed mechanical seal.
- \ Disassemble a failed mechanical seal.
- \ Identify the correct tool for O-ring extraction.
- \ Remove O-rings from a mechanical seal.
- \ Replace O-rings on a mechanical seal.
- \ Perform the preliminary checks prior to seal installation.
- \ Reassemble and install a new or repaired mechanical seal.

## PRECISION MEASURING INSTRUMENTS (PMI)

LENGTH: 8 Hours      CEU: 0.8 Credits      LANGUAGES: EN

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### OVERVIEW

This library consists of four lessons. The lessons in this library were designed for employees in all disciplines as well as for the multi-craft training needs of process and manufacturing facilities. In order to successfully complete these lessons participants should be familiar with whole number operations and decimals. This library describes the purpose and the basic components of some common precision measuring instruments. The library also provides procedures for properly using each of these instruments to measure the dimensions of an object.



## DIAL CALIPERS (1PMI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the first lesson in the Precision Measuring Instruments Library. This lesson describes the purpose and the basic components of dial calipers. The lesson also provides procedures for properly using a dial caliper to measure the dimensions of an object.

### MODULE OBJECTIVES

- \ Identify the beam, dial, and nibs of a dial caliper.
- \ Explain how to read a dial caliper and zero a dial caliper.
- \ Explain the use of the two sets of nibs on a dial caliper.
- \ Obtain the inside measurement of an object by using a dial caliper.
- \ Obtain the outside measurement of an object by using a dial caliper.

## MICROMETERS (2PMI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the second lesson in the Precision Measuring Instruments Library. This lesson describes the purpose and the basic components of outside micrometers, inside micrometers, and depth micrometers.

### MODULE OBJECTIVES

- \ Identify the main components of an outside, inside, and depth micrometer.
- \ Explain how to read a micrometer.
- \ Measure outside dimension using an outside micrometer.
- \ Measure inside dimension using an inside micrometer.
- \ Measure depth by using a depth micrometer.

## TELESCOPING AND THICKNESS GAUGES (3PMI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Precision Measuring Instruments Library. This lesson describes the purpose and the basic components of telescoping gauges and thickness gauges.

### MODULE OBJECTIVES

- \ Measure the inside diameter of an object by using a telescoping gauge in conjunction with an outside micrometer.
- \ Demonstrate the proper way to insert and remove a telescoping gauge.
- \ Measure a clearance with a thickness gauge.
- \ Explain how to double-check your measurements.

## DIAL INDICATORS (4PMI)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the final lesson in the Precision Measuring Instruments Library. This lesson describes the purpose and the basic components of dial indicators.



### MODULE OBJECTIVES

- \ List some of the common uses of a dial indicator and explain how a dial indicator works.
- \ Explain how to determine if a reading is positive or negative.
- \ Describe the procedure for determining if a dial indicator is positioned properly.
- \ Describe how to determine if the dial indicator is secure.
- \ Measure small changes in dimension by using a dial indicator.

## VALVE REPAIR (VR)

LENGTH: 4 Hours CEU: 0.4 Credits LANGUAGES: EN

### OVERVIEW

General Description: This library consists of two Lessons, Gate Valve Repair and Globe Valve Repair. Topics include identifying valve parts and functions, valve inspection, valve assembly and disassembly, and valve positions.



## GATE VALVE REPAIR (1GV)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This lesson is designed for participants familiar with the operation of gate valves and the proper use of hand tools and precision measuring instruments.

### MODULE OBJECTIVES

- \ Identify the parts of a gate valve and describe their functions
- \ Inspect a valve and make adjustments to stop leakage
- \ Position rising stem and non-rising stem valves to the half-open position
- \ Remove and disassemble the bonnet assembly of a gate valve
- \ Use a telescoping gauge to determine if a stuffing box is round
- \ Perform a runout to determine if a stem is bent
- \ Use an outside micrometer to determine if the stem has excessive wear
- \ Lap a disc and perform a contact check of disc mating surfaces
- \ Reassemble the bonnet assembly of a gate valve
- \ Perform a contact check to determine if there is a proper seal between the seat and disc of a gate valve

## GLOBE VALVE REPAIR (2GV)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This lesson is designed for participants familiar with the basic operation of globe and control valves and the proper use of hand tools and precision measuring instruments.

### MODULE OBJECTIVES

- \ Identify the basic components of a typical globe valve
- \ Disassemble and inspect a globe valve for damage
- \ Describe what lapping is and explain when it is used
- \ Complete a dye check
- \ Reassemble a globe valve
- \ Identify the basic components of a typical control valve
- \ Disassemble and inspect a control valve for damage
- \ And reassemble a control valve.

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## GENERAL SKILLS

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The general skills library is a two-course offering covering skills useful on or off the job site. As computers and technology continue to become pervasive in virtually all aspects of our lives, the importance of keeping sensitive data secure continues to be an increasingly important concern. The mental tools to confront and address problems in a straightforward and logical manner will prove useful if a production line is out of commission or in problems in dealing with everyday annoyances.

## OFFICE COMPUTER DATA SECURITY (OS)

LENGTH: 2 Hours CEU: 0.2 Credits LANGUAGES: EN

### OVERVIEW

This library consists of one lesson designed to provide training for anyone using computers in the workplace. Topics include basic introduction, data, handling sensitive data, equipment, system access, and laws and policies. Additionally, this lesson covers how to protect computer system resources, compliance with appropriate use policies, how to react to a security violation, and monitoring and auditing.



## OFFICE COMPUTER DATA SECURITY (OS\_1EDS)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This Office Computer Data Security lesson was designed to provide training for anyone using computers in the workplace. This lesson will provide some practical measures to help protect your computer system from threats that may harm it.

### MODULE OBJECTIVES

- \ Explain how to protect your computer system resources.
- \ Explain how to comply with appropriate use policies.
- \ Explain how to react to a security violation.
- \ Explain monitoring and auditing.
- \ Explain how to comply with copyright laws.

## TROUBLESHOOTING SKILLS: DEVELOPING LOGICAL THINKING (DLT)

LENGTH: 8 Hours CEU: 0.8 Credits LANGUAGES: EN

### OVERVIEW

This library consists of four lessons. The lessons in this library teach strategic troubleshooting skills that can be applied to the analysis of problems in any type of industrial system. This library teaches participants how to develop logical thinking and create a personal troubleshooting outlook that will prove valuable under any troubleshooting situation.



## INTRODUCTION TO TROUBLESHOOTING (1DLT)

LENGTH: 2 Hours CEU: 0.2 Credits

### OVERVIEW

This is the first lesson in the Troubleshooting Skills: Developing Logical Thinking Library. This lesson defines root cause problem solving and troubleshooting. The lesson also describes the basic steps in a general troubleshooting procedure.

### MODULE OBJECTIVES

- \ Define root cause problem solving.
- \ Define troubleshooting and the basic steps involved in a general troubleshooting procedure.

## INFORMATION GATHERING (2DLT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The second lesson in the Troubleshooting Skills: Developing Logical Thinking Library, presents the steps involved in interviewing and researching to obtain information about a malfunctioning system and the importance of investigating the normal operation and history of the system. The relationship between symptom and cause is also explained.

### MODULE OBJECTIVES

- \ Describe how to obtain information about a malfunctioning system.
- \ Describe sources of information concerning normal operations.
- \ Describe sources of information concerning the background of a problem.
- \ State the relationship between a symptom and a cause.

## TROUBLESHOOTING (3DLT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

This is the third lesson in the Troubleshooting Skills: Developing Logical Thinking Library. This lesson teaches participants to develop a troubleshooting plan to evaluate problems. The importance of schematics in troubleshooting, steps necessary to repair the problems, and prevention of future trouble is discussed.

### MODULE OBJECTIVES

- \ Describe how to develop a trouble-shooting plan.
- \ Describe the importance of using schematics while troubleshooting.
- \ Describe steps necessary to repair the problem.

## IMPROVING SKILLS (4DLT)

LENGTH: 2 Hours      CEU: 0.2 Credits

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### OVERVIEW

The final lesson in the Troubleshooting Skills: Developing Logical Thinking Library uses the information taught in the previous lessons in the library to assist in improving the learner's troubleshooting skills. The learner will be instructed in the steps needed to prevent future trouble, and in the best practices for troubleshooting.

### MODULE OBJECTIVES

- \ Describe steps that can be taken to prevent future trouble.
- \ Explain the importance of a troubleshooting outlook.
- \ Describe how to troubleshoot under pressure.
- \ Describe the importance of experience in troubleshooting.



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