



Technical Training Courseware



COURSEWARE & TRAINING



GP Strategies delivers a proven approach to achieve world-class technical training competencies that are seen in leading organizations. Based on years of on-site training experience, GP Strategies provides the entire spectrum of technical training, from precision maintenance, craft skills, and operator care to operations, reliability, and safety.

What makes GP Strategies' training programs unique?

- **A blended learning model:** We tailor and deploy our training services through a variety of blended learning modalities, including eLearning, instructor-led, hands-on, and virtual.
- **More hands-on training:** In addition to eLearning, all of the customized training programs and on-site courses feature 60%–70% hands-on lab instruction to increase learning retention and improve performance.
- **Subject matter expertise:** GP Strategies' instructors bring industry-specific experience expertise to help you develop a multi-skilled workforce that can respond to evolving business changes.
- **A proven track record for success:** For over 50 years, GP Strategies has successfully helped companies design, develop, and implement comprehensive training programs that deliver ROI.

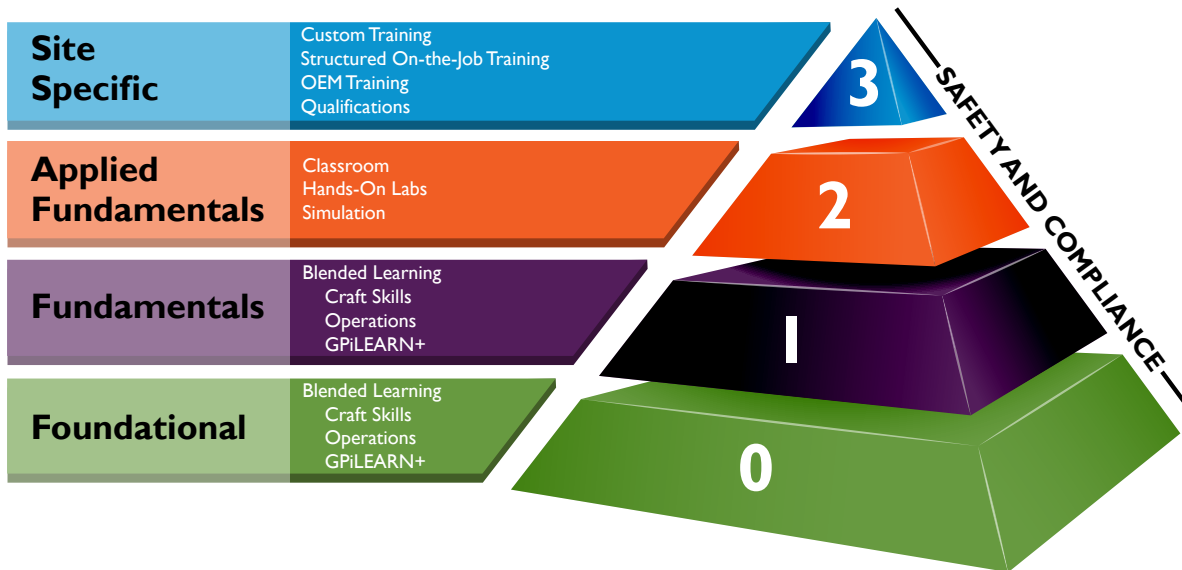
A systematic approach to achieve a highly skilled workforce.

GP Strategies' training platform, crafted to deliver maximum learning benefits to your workforce, is based on a progression through four competency levels: Foundational, Fundamentals, Applied Fundamentals, and Site Specific. Often, we conduct a customer needs or gap analysis first to recommend the best design, courseware, and delivery to meet each company's unique needs. However, we also provide off-the-shelf solutions to support organizations that have a structured training program already in place.

Contact us to learn how GP Strategies can help you implement a best-in-class technical training program:

maintenance@gpstrategies.com | 1.888.843.4784

Progression Pyramid for Technical Training



LEVEL 0: FOUNDATIONAL

The Foundational level provides the basic essentials for new hires or entry-level employees, and focuses on core math, print reading, and technical skills to ensure that they can perform at the higher levels.

LEVEL 1: FUNDAMENTALS

The Fundamentals level introduces much of the theory, such as Kirchhoff's Law and Pascal's Law, associated with the maintenance and reliability processes and includes basic concepts of hydraulics, pneumatics, pumps, PLCs, motors, etc.

LEVEL 2: APPLIED FUNDAMENTALS

The Applied Fundamentals level transfers the theory and knowledge elements into practical applications. This ensures that your technicians and operators are trained to perform all of their required tasks and gives them the hands-on learning opportunities to practice these critical skills.

LEVEL 3: SITE SPECIFIC

The Site-Specific level ensures that your maintenance and reliability team is fully capable and well trained on the use and maintenance specific to your equipment.

Courseware and Training Options

- **Off the Shelf:** Select our standard training if a generic course suits your needs.
- **Customized:** GP Strategies can enhance your existing training program or develop a customized solution.
- **IP License Agreement:** Access GP Strategies' off-the-shelf courseware through a perpetual intellectual property (IP) license agreement. GP Strategies' courseware includes student guides, instructor guides, instructor presentations, testing materials, and hands-on lab guides.

INDUSTRIAL-LEVEL EQUIPMENT



GP Strategies is proud to offer a full line of industrial-level training equipment to support instructor-led, hands-on training as part of a blended learning solution.

Some examples of training equipment include:

- Motor Starter
- Motor Controller
- Electrical A-Frame
- Pneumatics Trainer
- Chain Drive Trainer
- Pump Trainer
- Process Control Trainer
- Valve Trainer
- Pulley Trainer

Technical Training Center

In addition, GP Strategies operates a technical training center located at their Tampa Operations office. The Tampa Technical Training Center includes three large, separate classrooms along with two equipment labs, completely outfitted with full-size training equipment. The following training options and advantages are available:

- Choose from training equipment delivered to your facility to minimize downtime.
- Alternatively, benefit from classes and labs hosted at GP Strategies' Tampa Technical Training Center.
- Benefit from industry-quality equipment, which provides your workforce with a realistic training environment.
- Experience customized maintenance training courseware and labs leveraging the equipment.
- Choose from a variety of equipment, including mechanical, electrical, process, and instrumentation control.
- Select the option to purchase the industrial training equipment for internal learning.

Support the needs of your most critical personnel in an environment dedicated to hands-on learning, and experience improvements in the efficiency of your day-to-day operations.

Industrial-level training equipment accompanies hands-on training in the following Course Series:

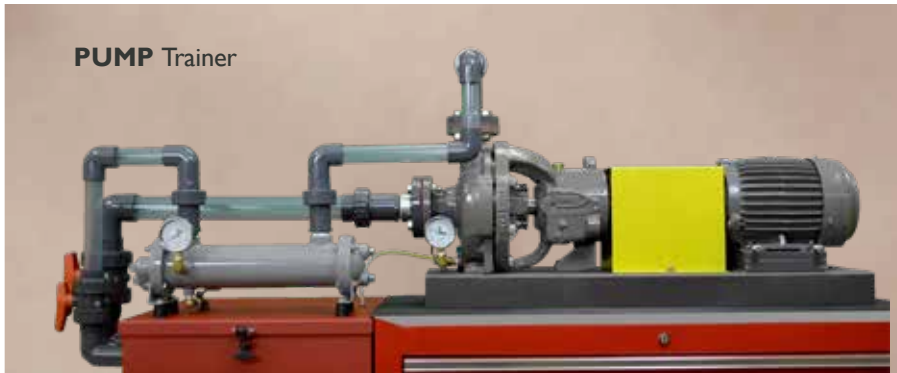
- Electrical
- Instrumentation & Control
- Mechanical
- Multi-Craft



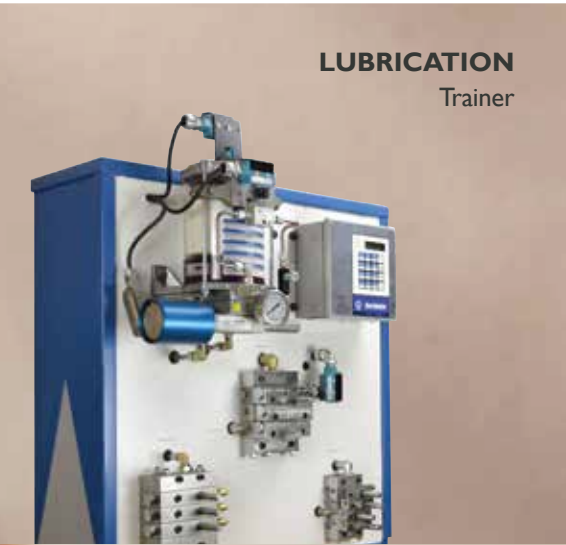
PULLEY Trainer



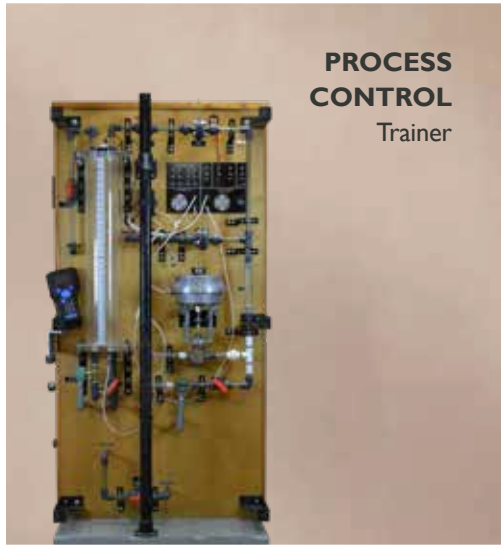
PUMP Trainer



LUBRICATION
Trainer



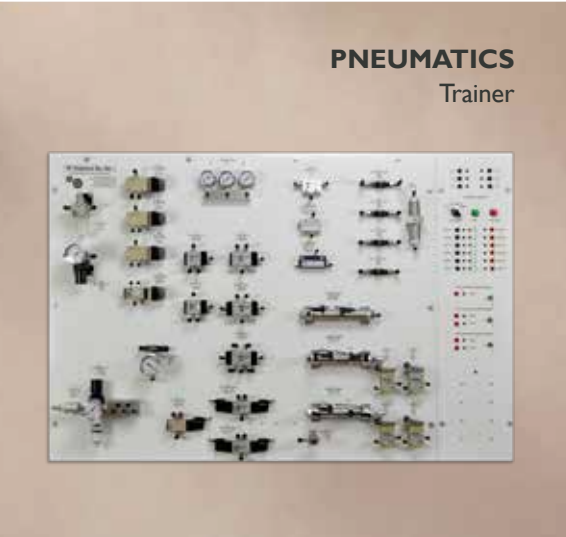
PROCESS
CONTROL
Trainer



ELECTRICAL A-FRAME
Trainer



PNEUMATICS
Trainer



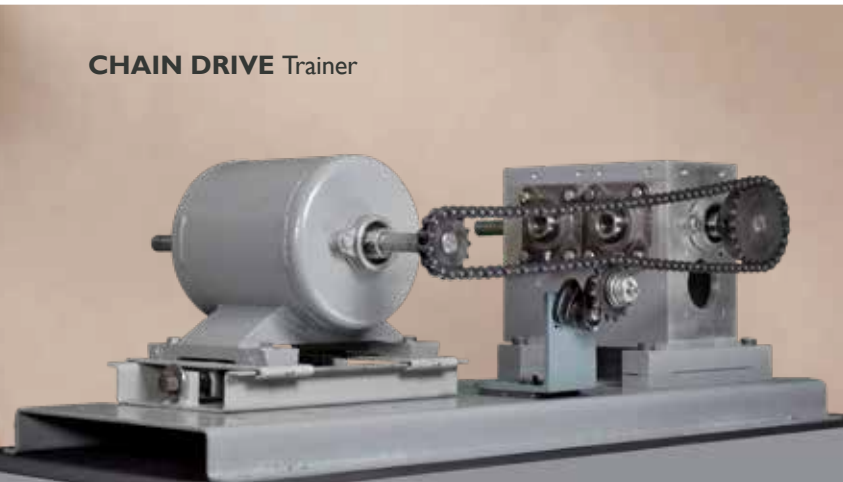
VALVE
Trainer



MOTOR CONTROLLER
Trainer



CHAIN DRIVE Trainer



MOTOR STARTER Trainer



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1 FUNDAMENTALS



BASIC ELECTRICAL CONCEPTS

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-100: Basic Electrical Concepts

- Identify the types of electrical energy.
- Discuss the composition of the atom and its relation to electrical charge.
- Explain the characteristics of current, voltage, and resistance.
- Explain Kirchhoff's Current Law and Kirchhoff's Voltage Law
- Calculate equivalent resistance of series and parallel resistive circuits.
- Calculate DC circuit parameters using Ohm's Law, Kirchhoff's Current Law, and Kirchhoff's Voltage Law.
- Describe the characteristics of capacitors and capacitance.
- Describe the characteristics of inductors and inductance.
- Describe the construction and operation of a simple AC generator.
- Define inductive reactance.
- Calculate the inductive reactance of a simple AC circuit.
- Define capacitive reactance.
- Calculate the capacitive reactance of a simple AC circuit.
- Define impedance.
- Describe the relationship between apparent, true, and reactive power.
- Define power factor as it relates to true power and apparent power.

 ONLINE | GPiLEARN+ COURSES

EL0703: Alternating Current (AC) Generators

IE0201: Alternating Current (AC) Theory

PF1502: Alternating Current (AC) Electricity and Generators

MOTOR THEORY

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

EM-105: Motor Theory

- Describe the general characteristics of electric motors.
- Describe the construction and operation of DC motors.
- Identify the types of DC motors.
- Describe how DC motors are controlled.
- Describe the construction and operation of AC motors.
- Identify the types of AC motors.
- Describe how AC motors are controlled.
- Identify the information on a motor nameplate.
- Describe DC and AC motor maintenance activities.
- Describe the InterNational Electrical Testing Association guidelines for testing motors.

 ONLINE | GPiLEARN+ COURSES

EL0701: Operating Characteristics of Various Types of Motors

EL0702: Types of Motor

EL0704: Operation Theory of Induction Motors

EL0706: Types of Motors Construction

EL0708: Motor Troubleshooting

EL0709: Determination of Faulty Major Component of a Motor System

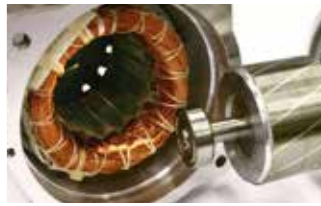
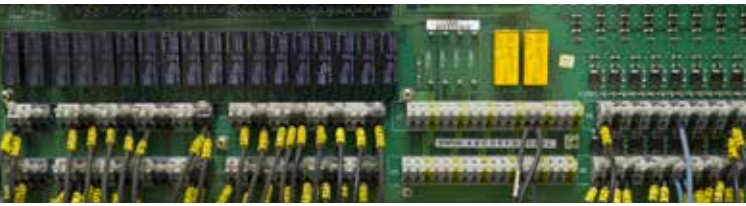
EL0711: Procedure to Clean a Motor

EL0712: Motor Disassembly

EL0713: Motor Reassembly Techniques

EL0714: Operational Checks to Perform When a Motor Is Returned to Service

PF1604: Motors



GENERATOR THEORY

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

EM-110: Generator Theory

- Identify the terminology associated with AC and DC generators.
- List and describe the major components of an AC generator.
- Describe AC power generation theory.
- Explain the operation of AC generators.
- List and describe the major components of a DC generator.
- Describe DC power generation theory.
- Explain the operation of DC generators.

 ONLINE | GPiLEARN+ COURSES

EL0703: Alternating Current (AC) Generators

EL0717: Types of Generator Construction

PF1502: Alternating Current (AC) Electricity and Generators

PF1503: Basic Generator/Exciter Operation

ELECTRICAL TEST EQUIPMENT

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

EM-115: Electrical Test Equipment

- Describe the operation of an analog meter.
- Describe the operation of a clamp-on ammeter.
- Describe the operation of a digital meter.
- Describe the operation of a voltage detector.
- Describe the operation of the basic oscilloscope.
- Calculate amplitude, frequency, period, phase difference, and duty cycle.
- Describe the operation of a megohmmeter (megger).
- Explain the purpose of thermography.

 ONLINE | GPiLEARN+ COURSES

AT02: Multimeters

AT03: Oscilloscopes

AT05: Temperature Measurements

AT06: Voltage Testers

IE1205: Electrical/Electronic Test Equipment

NATIONAL ELECTRICAL CODE OVERVIEW

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

EM-120: National Electrical Code (NEC) Overview

- Identify the origin and purpose of the NEC.
- Describe the requirements of Article 90.
- Describe the general requirements for electrical installations (Chapter 1).
- Describe wiring and protection requirements (Chapter 2).
- Describe proper wiring methods and materials (Chapter 3).
- Describe the requirements for general use equipment (Chapter 4).
- Demonstrate the proper table usage found in Chapter 9.
- Demonstrate proper methods to calculate ampacity.
- Demonstrate proper methods to calculate conduit fill and size.

 ONLINE | GPiLEARN+ COURSES

EL0201: Safety Codes and Standards

CONDUIT BENDING AND WIRING

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-125: Conduit Bending and Wiring

- Identify and describe the purpose for the various types of conduit used for electrical runs.
- Interpret rigid metal conduit data.
- Explain conduit fill and spacing requirements.
- Explain and demonstrate proper methods to cutting, reaming, bending, and installing conduit.
- Identify the difference between conductors, insulators, and semiconductors, and describe the key characteristics of each.
- Describe cable construction and characteristics of the different components used in construction of cables.
- Discuss the operating characteristics of electrical cables.
- Describe the different methods of cable installation and their advantages and disadvantages over other methods of installations.
- Demonstrate proper techniques to pull wire or cable.
- Describe the precautions that must be observed when splicing wires, and demonstrate how wire and cable are spliced.
- Describe the precautions and tools used to terminate wiring, and demonstrate proper wire termination methods.
- Demonstrate the proper techniques for connecting wiring to terminal boards.

2 APPLIED FUNDAMENTALS



POWER TRANSFORMERS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

EM-200: Power Transformers

- Identify and discuss safety issues relating to transformers.
- Explain the theory of transformer operations.
- List and describe the types of transformers.
- Describe the construction and nameplate information of a transformer.
- Demonstrate different types of transformer tap connections.
- Demonstrate proper inspection techniques for transformers.
- Demonstrate proper maintenance techniques for transformers.

 ONLINE | GPiLEARN+ COURSES

- EL0401: Transformer Characteristics
- EL0402: Essential Parts of a Simple Transformer
- EL0403: Relationship Between Primary and Secondary Voltages and Transformer Turns Ratio
- EL0404: Potential Transformer
- EL0405: Current Transformer
- EL0406: Power Transformer
- EL0410: Transformer Troubleshooting Techniques
- EL0411: Causes of Transformer Failure
- EL0412: Removal of Transformers From Service
- EL0413: Safety Hazards Related to Transformers
- EL0414: Isolation of Plant Main and Auxiliary Transformers
- EL0415: Grounding of Plant Main and Auxiliary Transformers
- EL0416: Return of Transformers to Service
- PF1601: Station Service Systems and Transformers

LOW VOLTAGE SWITCHGEAR

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-205: Low Voltage Switchgear

- List and explain the voltage level conventions used in electrical equipment.
- List and describe the components that make up electrical switchgear.
- Identify and explain the four general classifications of circuit breakers.
- List and explain the major ratings of circuit breakers.
- Discuss the major components associated with a power system.
- Demonstrate inspection methods of low voltage circuit breakers.

 ONLINE | GPiLEARN+ COURSES

PF1602: Circuit Breakers

MEDIUM VOLTAGE SWITCHGEAR

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-210: Medium Voltage Switchgear

- Demonstrate inspection methods of medium voltage circuit breakers.

HIGH VOLTAGE SWITCHGEAR

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-215: High Voltage Switchgear

- Demonstrate inspection methods of high voltage circuit breakers.



PROTECTIVE RELAYS

 INSTRUCTOR-LED/HANDS-ON  | 32 HOURS

EM-220: Protective Relays

- Identify the purpose and types of protective relays.
- List and describe the components found in protective relays.
- Describe the functions of protective relays.
- Discuss methods for protective relay testing.
- List and demonstrate protective relay function tests.
- Identify and demonstrate common maintenance tasks associated with protective relays.

 ONLINE | GPiLEARN+ COURSES

PF1603: General Relaying

BATTERIES AND UNINTERRUPTABLE POWER SUPPLIES

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

EM-225: Batteries and Uninterruptable Power Supplies

- Identify the types of batteries.
- Describe the construction and operation of various batteries.
- Identify industry and government standards for maintenance, testing, replacement, sizing, and installation of lead-acid batteries.
- Identify federal regulations governing lead-acid battery disposal.
- Describe the construction and operation of a UPS.
- Describe the function and operation of a transfer switch.
- Inspect a UPS system.
- Analyze battery charge and discharge rate to determine if replacement is needed.

 ONLINE | GPiLEARN+ COURSES

EL0601: Battery Charger Operation

EL0603: Procedure for Placing the Battery Charger in Service

EL0604: Procedure for Removing the Battery Charger From Service

MOTOR CONTROL AND TROUBLESHOOTING

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-230: Motor Control and Troubleshooting

- List and explain a systematic approach to troubleshooting electrical circuits.
- List and describe the purpose and application of various motor control components.
- Explain methods for inspecting electrical contacts.
- Describe three basic methods of starting a three-phase AC motor using full or reduced voltage.
- Describe the basic operation of a three-phase AC motor.
- Describe methods for troubleshooting AC motors.
- Apply a systematic approach to troubleshooting motor control circuits.
- Design and construct motor control circuits.
- Implement proper motor control troubleshooting techniques.
- Analyze and evaluate faults to determine motor control components.

 ONLINE | GPiLEARN+ COURSES

EL0701: Operating Characteristics of Various Types of Motors

EL0704: Operational Theory of Induction Motors

EL0708: Motor Troubleshooting

EL0709: Determination of Faulty Major Component of a Motor System

EL0801: Control Device Troubleshooting

EL0802: Faults Associated With Control Devices

PF1604: Motors

3 SITE SPECIFIC



BASIC PROGRAMMABLE LOGIC CONTROLLERS (PLC-5)

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-300: Basic Programmable Logic Controllers (PLC-5)

- Identify general PLC circuit and logic contact symbology.
- Describe the purpose of the address in memory.
- Identify contact symbols.
- Use the programming software to configure a PLC.
- Use the programming software to create and edit ladder logic programs.
- Create a ladder logic motor controller.
- Use the programming software to force bit state.
- Create a timer-based program.
- Create a counter-based program.

 ONLINE | GPiLEARN+ COURSES

IE0805: Interpreting and Drafting Ladder Logic With Bit Instructions in PLC Systems

ANALOG INPUT/OUTPUTS (PLC-5)

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

EM-310: Analog Input/Outputs (PLC-5)

- List and describe the components of a PLC-5 and their function.
- Describe the function of an analog input and output card.
- Demonstrate proper setup of an analog input and output card.
- Demonstrate proper programming of analog cards.
- Demonstrate proper configuration of analog cards.
- Analyze system requirements and create a program using analog inputs and outputs.

DEVICENET FOR SLC-500

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

EM-315: DeviceNet for SLC-500

- Configure a DeviceNet network using RSNetWorx.
- Install and configure a VFD to operate via DeviceNet from a SLC-500.

INTRODUCTION TO DRIVES

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

EM-320: Introduction to Drives

- Describe the operation of diodes, SCRs, and transistors.
- Match the proper motor, gearing drive, and electrical power to a load.
- Describe the basic functions of AC drive hardware.
- Identify the characteristics of shunt and series wound motors.
- Differentiate between field control and armature control of a DC motor.
- Describe the operation of various types of AC drives.
- Describe the operation of various types of DC drives.
- Use the parameters associated with a drive to control motor operation.

 ONLINE | GPiLEARN+ COURSES

IE0301: Electrical Characteristics of Diodes

IE0302: Electrical Characteristics of SCRs and TRIACs

IE0303: Semiconductor Circuit Troubleshooting

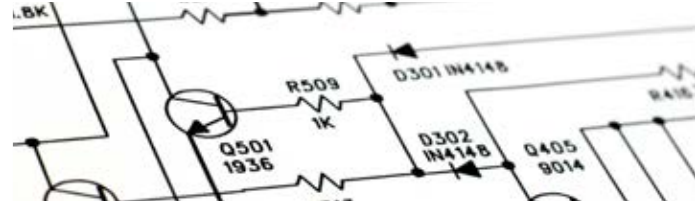
VARIABLE FREQUENCY DRIVES

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

EM-325: Variable Frequency Drives

- List and describe the operation of components found in a PowerFlex 70.
- List and explain the parameters found in a PowerFlex 70.
- Demonstrate proper installation and setup of a PowerFlex 70.
- Demonstrate proper troubleshooting techniques on a PowerFlex 70.

0 FOUNDATIONAL



INTRODUCTION TO INDUSTRIAL MATH

 INSTRUCTOR-LED/HANDS-ON | 8 to 16 HOURS

FND-000: Introduction to Industrial Math

- Calculate the sum, difference, product, and quotient of whole numbers.
- Solve problems using fractions.
- Solve problems using decimals.
- Calculate a percentage using fractions and decimals.
- Calculate measurements using fractions and decimals.
- Calculate the sum, difference, product, and quotient of signed numbers.
- Solve problems using powers and roots.
- Apply mathematical principles to evaluate algebraic expressions.

 ONLINE | GPiLEARN+ COURSES

BA0102: Math Problems Using Addition, Subtraction, Multiplication, and Division

BA0103: Math Problems Using Whole Numbers and Decimals

BA0107: Decimals and Fractions Into Percentages

BA0109: Negative Powers of Ten

BA0110: Positive Powers of Ten

ADVANCED INDUSTRIAL MATH

 INSTRUCTOR-LED/HANDS-ON | 8 to 16 HOURS

FND-005: Advanced Industrial Math

- Measure and calculate angles.
- Identify the types of triangles.
- Calculate the side of a right triangle using Pythagorean Theorem.
- Identify and calculate the parameters of polygons.
- Calculate the parameters of a solid figure.
- Apply geometric principles to solve problems.
- Solve problems using basic trigonometric functions.

 ONLINE | GPiLEARN+ COURSES

BA0111: Area

BA0118: Dimensional Properties

BA0119: Dimensional Problems

BA0124: Triangles

MATH USING THE METRIC SYSTEM

 INSTRUCTOR-LED/HANDS-ON | 8 HOURS

FND-010: Math Using the Metric System

- Identify common metric units for mass, length, volume, temperature, force, and pressure.
- Identify the symbols used for common metric units.
- Identify metric unit prefixes and symbols.
- Complete metric-to-metric conversions.
- Complete English-to-metric and metric-to-English conversions.
- State the common rules for writing in metric.

 ONLINE | GPiLEARN+ COURSES

BA0116: Measurement Systems

BA0117: Utilizing Conversion Units

MECHANICAL PRINT READING

 INSTRUCTOR-LED/HANDS-ON | 16 HOURS

FND-015: Mechanical Print Reading

- List and explain the types of mechanical drawings.
- Explain and describe the purpose of the title block, legend, revisions, and material list in terms of location and content.
- Describe and identify the meaning of each of the six types of lines used in drawings.
- Identify and define the types of views used in drawings.
- Given a drawing, identify its construction, size, and location dimensions.
- Locate and identify tolerances on machine drawings.
- Measure and identify screw threads.
- Identify and discuss the different types of dimensions found in drawings.
- Identify and discuss the different elements of a P&ID.
- Draw schematics of simple mechanical systems.

 ONLINE | GPiLEARN+ COURSES

EL0101: Classifications of Prints and Drawings

EL0109: Tracing of Flow Paths of Plant Piping and Instrumentation Diagrams (P&IDs)

MM0601: Piping and Instrumentation Drawing Symbols

MM0602: Interpretation of Piping and Instrumentation Drawings

MM2405: Fasteners

0 FOUNDATIONAL



MECHANICAL SAFETY AND LOCKOUT/TAGOUT

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

FND-020: Mechanical Safety and Lockout/Tagout

- Identify and discuss electrical safety hazards.
- Discuss the hazards of stored energy in hydraulic and pneumatic systems.
- Given a scenario, discuss the proper use of personal protective equipment.
- Given a scenario, discuss the hazards particular to mechanical work and the precautions/countermeasures for each hazard.
- Describe mechanical system lockout/tagout requirements.

 ONLINE | GPiLEARN+ COURSES

- ND-BCS-1.0: Construction Safety
- ND-BCS-2.0: Struck-By and Caught-Between Injuries for Construction
- ND-CGS-1.0: Compressed Gas Safety
- ND-ELT-1.0: Electrical Safety
- ND-ELT-2.0: Electrical Safety - Grounding
- ND-ELT-3.0: Electrical Safety Above 601 Volts
- ND-ELT-4.0: Electrical Safety - Arc Flash
- ND-EXC-1.0: Excavation and Trenching
- ND-HRC-1.0: Hearing Conservation
- ND-JSA-1.0: Job Safety Analysis
- ND-LOT-1.0: Lockout/Tagout - Competency Format
- ND-MCG-1.0: Machine Guarding
- ND-PPE-1.0: Personal Protective Equipment
- ND-PPE-2.0: Hand and Pinch Point Safety
- ND-RSP-1.0: Respiratory Protection
- OS0901: Electrical Safety
- OS1501: Hearing Conservation - Module 1
- OS1502: Hearing Conservation - Module 2
- OS1701: Lockout/Tagout - Module 1
- OS1702: Lockout/Tagout - Module 2
- OS1901: PPE General Protection
- OS1902: PPE Foot Protection
- OS1903: PPE Eye and Face Protection

- OS1904: PPE Hand Protection
- OS1905: PPE Head Protection
- OS2001: Respirators - Module 1
- OS2002: Respirators - Module 2
- OS2003: Respirators - Module 3
- OS2501: Arc Flash Awareness
- PF0101: Plant Hazards and Protective Gear

ELECTRICAL SAFETY FOR NON-QUALIFIED PERSONNEL

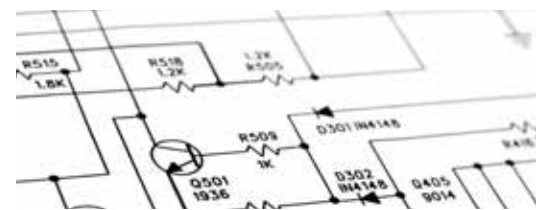
 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

FND-025: Electrical Safety for Non-Qualified Personnel

- Review applicable OSHA 1910 regulations and NFPA 70E standards regarding arc flash protection.
- Review applicable OSHA 1910 regulations and NFPA 70E standards regarding lockout/tagout.
- Review applicable OSHA 1910 regulations and NFPA 70E standards regarding personal protective equipment.

 ONLINE | GPiLEARN+ COURSES

- ND-ELT-4.0: Electrical Safety - Arc Flash
- ND-LOT-1.0: Lockout/Tagout - Competency Format
- OS0901: Electrical Safety
- OS1701: Lockout/Tagout - Module 1
- OS1702: Lockout/Tagout - Module 2
- OS2501: Arc Flash Awareness



ELECTRICAL PRINT READING

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

FND-030: Electrical Print Reading

- Describe the organization of an electrical print.
- Identify common electrical schematic symbols.
- Interpret an electrical block diagram and a one-line diagram.
- Interpret an electrical three-line diagram.
- Interpret a P&ID.
- Analyze a basic logic circuit.
- Interpret basic ladder logic.

 ONLINE | GPiLEARN+ COURSES

- EL0101: Classifications of Prints and Drawings
- EL0102: Schematic Diagrams
- EL0103: Connection Diagrams
- EL0104: Logic Diagrams
- EL0105: Single-Line Diagrams
- EL0106: Elementary Diagrams
- EL0107: Electrical-Electronic Print and Drawing Reading
- EL0108: Symbols/Components on Prints and Drawings
- EL0109: Tracing of Flow Paths of Plant Piping and Instrumentation Diagrams (P&IDs)

ELECTRICAL SAFETY FOR QUALIFIED PERSONNEL

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

FND-035: Electrical Safety for Qualified Personnel

- Describe general safety hazards and precautions associated with electrical systems.
- Describe electrical tool and equipment safety.
- Define voltage level conventions for electrical systems.
- Describe electrical lockout/tagout requirements.
- Identify the requirements for working on energized equipment.
- Given a scenario, describe the requirements associated with arc flash protection.
- Explain the requirements for protective grounding.
- Describe the electrical safety requirements associated with fuses.

- Describe the electrical safety requirements associated with switchgear and circuit breakers.
- Describe the electrical safety requirements for batteries and DC systems.

 ONLINE | GPiLEARN+ COURSES

- EL0601: Battery Charger Operation
- EL0603: Procedure for Placing the Battery Charger in Service
- EL0604: Procedure for Removing the Battery Charger From Service
- EL1103: Identification of Unwanted Circuit Grounds
- EL1104: Elimination of Unwanted Circuit Grounds
- EL1105: Equipment Grounding Concepts
- EL1106: Testing of Proper Equipment Grounds
- EL1107: Direct Current (DC) Ground Detection
- MM2403: Power Tools
- ND-ELT-1.0: Electrical Safety
- ND-ELT-2.0: Electrical Safety - Grounding
- ND-ELT-3.0: Electrical Safety Above 601 Volts
- ND-ELT-4.0: Electrical Safety - Arc Flash
- OS0901: Electrical Safety
- OS1702: Lockout/Tagout - Module 2
- OS2501: Arc Flash Awareness
- PF1602: Circuit Breakers

HAND AND POWER TOOLS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

FND-040: Hand and Power Tools

- Describe the safe use and operation of measuring tools.
- Describe the safe use and operation of hand tools.
- Describe the safe use and operation of power tools.

 ONLINE | GPiLEARN+ COURSES

- MM2401: Non-Powered Hand Tools - Part 1
- MM2402: Non-Powered Hand Tools - Part 2
- MM2403: Power Tools
- MM2404: Measuring Tools

1 FUNDAMENTALS



INDUSTRIAL ELECTRONICS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

I&C-100: Industrial Electronics

- Discuss the characteristics and uses of semiconductor devices.
- Discuss the characteristics and uses of bipolar transistors.
- Describe the operation of diodes.
- Describe the operation of transistors.
- Describe the operation of amplifiers.

 ONLINE | GPiLEARN+ COURSES

IE0301: Electrical Characteristics of Diodes

IE0402: Theory of Operational Amplifier Circuits

DIGITAL CIRCUITS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

I&C-105: Digital Circuits

- Convert a number between binary and decimal.
- Describe the difference between analog and digital circuits.
- Describe the gates found in digital logic.
- Simplify expressions using Boolean algebra.
- Describe how to combine logic gates.
- Describe the circuit found in sequential logic.

 ONLINE | GPiLEARN+ COURSES

IE0506: Appropriate Digital Circuit Outputs From Specified Inputs

INSTRUMENTATION OVERVIEW

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-110: Instrumentation Overview

- Identify the different types of instruments used in an instrumentation loop.
- Describe and explain the function of components that are used for an instrumentation loop.
- Demonstrate how to build a basic instrumentation loop.

 ONLINE | GPiLEARN+ COURSES

AC02: Closed and Open Loop Control Systems

AI01: Criteria for Control Instruments

AI02: Characteristics of Control Instruments

IE1101: Principles of Control Loops

PF1702: Understanding Control Loops

INTRODUCTION TO HART COMMUNICATIONS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-115: Introduction to HART Communications

- Identify and discuss the components of a HART communicator.
- Demonstrate connection methods to field devices.
- Demonstrate how to properly set up and calibrate field devices.



COMBUSTION BASICS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

I&C-120: Combustion Basics

- Explain the flame triangle.
- Describe the relationship between heat, temperature, and specific heat.
- List and discuss the different methods of heat transfer.
- Identify and discuss the by-products of combustion.
- Identify and describe the importance of stoichiometric conditions.
- Describe the construction of basic combustion systems.
- Describe the safety equipment associated with a combustion system.
- Design a basic fuel train for a combustion system.

 ONLINE | GPiLEARN+ COURSES

OP0509: Safety Features of the Fuel System

OP0510: Functions of the Safety Features of the Fuel System

PF0202: Combustion System Components

PF0402: Chemistry of Combustion

PF0403: Heat Transfer

PF0904: Fuel Systems

INTRODUCTION TO DISTRIBUTED CONTROL SYSTEMS (DCS)

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-125: Introduction to Distributed Control Systems (DCS)

- List and explain the concepts of computer networking and communications.
- Describe the components of a DCS and their functions.
- Describe communications in a DCS.

2 APPLIED FUNDAMENTALS



PROCESS CONTROLS FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-200: Process Controls Fundamentals

- List and explain process control terms.
- Describe how a single or multiple capacity process responds to change.
- Demonstrate proper two-position control loop installation.
- Demonstrate basic proportional control loop installation.

 ONLINE | GPiLEARN+ COURSES

- AC01: Process Control Fundamentals
- AC02: Closed and Open Loop Control Systems
- AC03: Proportional Control
- AC04: Proportional Plus Integral Control
- AC05: Proportional Plus Derivative Control
- AI02: Characteristics of Control Instruments
- AI03: Controller and Control Action

INTRODUCTION TO PROPORTIONAL- INTEGRAL-DERIVATIVE (PID) TUNING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-210: Introduction to Proportional-Integral-Derivative (PID) Tuning

- List and describe the factors that affect system stability.
- Demonstrate closed loop tuning methods.
- Demonstrate open loop tuning methods.

 ONLINE | GPiLEARN+ COURSES

- AC07: Open Loop Transient Response Tuning
- AC08: Ziegler-Nichols Controller Tuning
- AC09: Frequency Response Controller Tuning
- AC10: Advanced Controller Methods

INTRODUCTION TO PROPORTIONAL- INTEGRAL-DERIVATIVE (PID) SYSTEMS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

I&C-205: Introduction to Proportional-Integral-Derivative (PID) Systems

- Identify and explain the different control methods used in PID systems.
- Describe how changing control parameters affects system response.
- Demonstrate proper installation of PID systems.
- Demonstrate proper troubleshooting of PID systems.

 ONLINE | GPiLEARN+ COURSES

- AC06: Proportional Plus Integral Plus Derivative Control

3 SITE SPECIFIC



DIFFERENTIAL PRESSURE CELLS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-300: Differential Pressure Cells

- Identify and describe the components of a differential pressure cell.
- Describe how a differential pressure cell operates.
- Demonstrate different connection methods and uses of a differential pressure cell.
- Demonstrate proper setup and calibration of a differential pressure cell.

 ONLINE | GPiLEARN+ COURSES

AM02: Pressure Measuring Instruments

LEVEL DETECTION

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-305: Level Detection

- Identify and describe the components of different level detection devices.
- Describe how level detection devices operate.
- Demonstrate different connection methods and uses of level detection devices.
- Demonstrate proper setup and calibration of level detection devices.

 ONLINE | GPiLEARN+ COURSES

AM03: Liquid Level Measurement

FLOW DETECTION

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-310: Flow Detection

- Identify and describe the components of different flow measurement devices.
- Describe how flow measurement devices operate.
- Demonstrate different connection methods and uses of flow measurement devices.
- Demonstrate proper setup and calibration of flow measurement devices.

 ONLINE | GPiLEARN+ COURSES

AM04: Flow Measurement

TEMPERATURE DETECTION

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-315: Temperature Detection

- Identify and describe the components of different temperature measurement devices.
- Describe how temperature measurement devices operate.
- Demonstrate different connection methods and uses of temperature measurement devices.
- Demonstrate proper setup and calibration of temperature measurement devices.

 ONLINE | GPiLEARN+ COURSES

AM05: Temperature Measurements

FINAL CONTROL ELEMENTS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

I&C-320: Final Control Elements

- Identify and describe the components that are used in pneumatically controlled actuators.
- Demonstrate proper setup and calibration of a pneumatically controlled actuator.
- Identify and describe the types of electrically controlled final elements.
- Demonstrate proper setup and calibration of electrically controlled final elements.

 ONLINE | GPiLEARN+ COURSES

AC11: Final Control Actuators

AT10: Pneumatic Calibrators

AT11: Mechanical and Pneumatic Testing and Calibrating

EL1201: Method of Setting Limit Switches

EL1202: Method of Setting Torque Switches

EL1203: Method of Repairing Limit Switches

EL1204: Method of Repairing Torque Switches

EL1205: Method of Replacing Limit Switches

EL1206: Method of Replacing Torque Switches

EL1207: Procedure to Electrically Stroke a Valve

EL1208: Procedure to Mechanically Stroke a Valve

IE1013: Calibration of Pneumatic Control Instruments

IE1018: Calibration of Valve Positioners

IE1022: Solenoid Valves

IE1115: Electronic Control Valves

IE1116: Electronic Control Valve Troubleshooting and Repair

1 FUNDAMENTALS



HEAT EXCHANGER FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-100: Heat Exchanger Fundamentals

- Identify and explain heat transfer within heat exchangers.
- Discuss safety precautions associated with heat exchangers.
- List and identify different types of heat exchangers and their major components.
- Identify maintenance and inspection activities associated with heat exchangers.

 ONLINE | GPiLEARN+ COURSES

- MM0801: Heat Exchanger Theories
- MM0802: Heat Exchanger Types and Characteristics
- MM0804: Heat Exchanger Testing
- MM0805: Heat Exchanger Inspections
- MM0806: Heat Exchanger Repairs
- MM0807: Heat Exchanger Tube Cleaning
- MM0808: Removal and Replacement of Heat Exchangers
- PF0403: Heat Transfer
- PF1203: Feedwater Components and Cycle Operation

VALVE FUNDAMENTALS

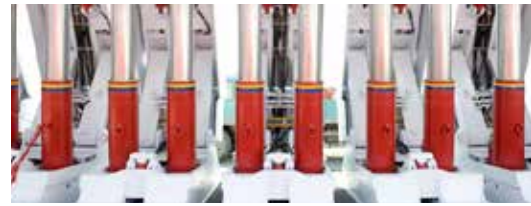
 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MM-105: Valve Fundamentals

- Identify the types of valves used in industrial applications.
- Describe the construction and operation of valves used in industrial applications.
- Identify the types of valve operators.
- List and explain valve markings.

 ONLINE | GPiLEARN+ COURSES

- AC11: Final Control Actuators
- AI05: Support Instruments
- IE1022: Solenoid Valves
- MM1301: Valve Theory
- MM1302: Valve Types and Characteristics
- MM1303: Operation Characteristics of Selected Valves
- MM1304: Components of Selected Valves
- MM1305: Characteristics of Valves to Applications
- MM1322: Plug, Gate, and Globe Valve Operating Characteristics
- PF1302: Valves, Traps and Piping



SEALS AND PACKING FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-110: Seals and Packing Fundamentals

- Identify the different types of compression packing, and explain when each is used.
- Identify the different types of molded packing, and explain when each is used.
- List the advantages and disadvantages of pump mechanical seals.

 ONLINE | GPiLEARN+ COURSES

MM0106: Identification of Sealing Mediums Used in Pumps

MM1306: Sealing Mediums Used in Valves

BEARING FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 16 to 24 HOURS

MM-115: Bearing Fundamentals

- Identify and explain the purpose for bearings.
- Discuss the basic terms associated with bearing design and construction.
- Identify and recognize the major components of various bearings.
- Demonstrate proper bearing maintenance and lubrication techniques.
- Demonstrate the proper installation and removal of bearings.
- Examine a bearing and analyze it to determine cause of failure.

 ONLINE | GPiLEARN+ COURSES

MM0201: Lubrication for Sliding and Rolling Surfaces

MM0202: Types and Uses of Lubricants

MM0203: Identification of Lubrication Characteristics by Bearing Types

MM0204: Proper Lubrication Techniques

MM0205: Loading and Bearing Types

MM0206: Bearing Selections

MM0207: Bearings by Type

MM0209: Bearing Operating Characteristics

MM0210: Sliding Surface Bearings

MM0211: Principles of Rolling Contact Bearings

MM0212: Bearing Component Matching by Type

MM0213: Identification of Seals Used With Bearings

MM0214: Use of Seals

MM0215: Removal of Sliding Surface Bearings

MM0216: Installation of Sliding Surface Bearings

MM0217: Bearing Disassembly

MM0218: Bearing Reassembly

MM0219: Sliding Surface/Rolling Contact Bearing Inspection

MM0223: Removal of Rolling Contact Bearings

MM0224: Installation of Rolling Contact Bearings

1 FUNDAMENTALS



BOILER FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-120: Boiler Fundamentals

- Explain the fundamentals of steam production.
- List and describe the major components in a boiler.
- Explain the basic operation of a boiler system.

 ONLINE | GPiLEARN+ COURSES

- OP0403: Air and Gas Flow Through the Boiler From Fans to Stack
- OP0404: Flow Path of Water and Steam From Economizer Inlet to Main Condenser
- OP0501: Major Components of the Fuel System
- OP0502: Function of the Major Components of the Fuel System
- OP0503: Flow Path of Fuel Through the Fuel System
- OP0506: Normal Operation of the Fuel System
- OP0509: Safety Features of the Fuel System
- OP1003: Major Components of the Fans
- OP1005: Operation of the Major Components for Fans
- OP1006: Function of the Air Preheater
- OP1007: Major Components of the Air Preheater
- OP1008: Functions of the Major Components of the Air Preheater
- OP1015: Functions of the Safety Features of the Fans
- OP1017: Safety Concerns, Protective Features, and Functions of the Air Preheater
- OP1032: Major Components of the Steam Air Heater System
- OP1101: Introduction to Sootblowing Systems
- OP1108: Protective Features of Sootblowing Systems
- OP1201: Major Components of the Boiler
- OP1202: Function of the Boiler Drum
- OP1203: Function of the Superheat and Reheat Attemperators
- OP1204: Flow Path of Water and Steam Through the Boiler Components

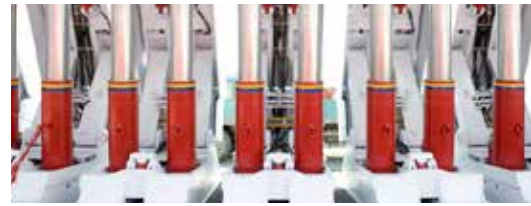
PF0202: Combustion System Components

PF0204: Boiler Water/Steam Cycle

PF1001: Steam Drums

PF1002: Waterwall Circulation, Superheaters, and Drains

PF1003: Economizer, Reheater, Gas Flow, Attemperation and Sootblowing



HYDRAULICS AND PNEUMATICS FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-125: Hydraulics and Pneumatics Fundamentals

- Describe the basic principles of fluid dynamics.
- State the relationship between force, pressure, and area.
- List and describe the major components of a hydraulic system.
- Identify the symbols used to identify hydraulic components in a schematic.
- List and describe the major components of a pneumatic system.
- Identify the symbols used to identify pneumatic components in a schematic.

 ONLINE | GPiLEARN+ COURSES

- AC11: Final Control Actuators
- AM01: Pressure Measurement
- AM02: Pressure Measuring Instruments
- MM1605: Matching Characteristics of Compressors to Applications
- MM1606: Air Compressor Intercoolers
- MM1607: Air Compressor Aftercoolers
- MM1608: Compressors With Dryers
- MM1618: Positive Displacement Reciprocating Compressor Components
- MM1701: Incompressibility of Fluids
- MM1702: Basic Components Common to Fluid Power Systems
- MM1703: Fluid Power System Diagramming
- MM1704: Purpose of Actuators
- MM1705: Basic Operations of an Actuator
- MM1706: Fluid Power System Control Valves
- MM1707: Valve Operation in Fluid Power Systems
- MM1708: Functions of Valves in Fluid Power Systems
- MM1709: Purpose of Accumulators
- MM1710: Types of Accumulators
- MM1711: Identification of Fluid Power Pumps
- MM1712: Operating Principles of Fluid Power Pumps

MM1713: Fluid Power Pump Applications

MM1715: Identification of Fluid Power Motors

MM1716: Operating Principles of Fluid Power Motors

MM1717: Fluid Power Motor Applications

MM1720: Fluid Characteristics

MM1721: Fluid Applications

MM1722: Fluid Power System Reservoirs

MM1723: Purpose of Filters

PF0302: Pressure

PF1301: Compressed Air & Plant Cooling Systems

1 FUNDAMENTALS



DIESEL ENGINES FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-135: Diesel Engines Fundamentals

- Describe the function of a diesel engine.
- List and describe the major components of a diesel engine.
- Describe the basic operation of a diesel engine.
- Discuss factors that affect engine operation.
- Discuss maintenance activities associated with a diesel engine.
- Troubleshoot common engine problems.

 ONLINE | GPiLEARN+ COURSES

OP0301: Emergency Generator Components

OP0302: Emergency Generator Auxiliary Equipment

OP0303: Emergency Generator Operation

RECIPROCATING COMPRESSORS FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-140: Reciprocating Compressors Fundamentals

- Describe the function of a reciprocating compressor.
- List and describe the major components of a reciprocating compressor.
- Describe the basic operation of a reciprocating compressor.
- Discuss factors that affect compressor operation.
- Discuss maintenance activities associated with a reciprocating compressor.
- Troubleshoot common compressor problems.

 ONLINE | GPiLEARN+ COURSES

MM1601: Compressor Theory and Classifications

MM1602: Operating Characteristics of Selected Compressors

MM1605: Matching Characteristics of Compressors to Applications

MM1606: Air Compressor Intercoolers

MM1607: Air Compressor Aftercoolers

MM1609: Air Compressor Sealing Mediums

MM1614: Single Stage Piston Air Compressor Overhaul

MM1615: Multi-Stage Piston Air Compressor Overhaul

MM1618: Positive Displacement Reciprocating Compressor Components



AXIAL FLOW COMPRESSORS FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-145: Axial Flow Compressors Fundamentals

- Describe the function of an axial flow compressor.
- List and describe the major components of an axial flow compressor.
- Describe the basic operation of an axial flow compressor.
- Discuss maintenance activities associated with an axial flow compressor.

 ONLINE | GPiLEARN+ COURSES

MM1601: Compressor Theory and Classifications

RADIAL FLOW COMPRESSORS FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-150: Radial Flow Compressors Fundamentals

- Describe the function of a centrifugal compressor.
- List and describe the major components of a centrifugal compressor.
- Describe the basic operation of a centrifugal compressor.
- Discuss factors that affect compressor operation.
- Discuss maintenance activities associated with a centrifugal compressor.

 ONLINE | GPiLEARN+ COURSES

MM1601: Compressor Theory and Classifications

PF1301: Compressed Air and Plant Cooling Systems

2 APPLIED FUNDAMENTALS



CENTRIFUGAL PUMPS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MM-200: Centrifugal Pumps

- Discuss centrifugal pump laws.
- List and describe terminology associated with centrifugal pumps.
- Identify the major components of a centrifugal pump and describe its function.
- Discuss factors affecting pump performance.
- Demonstrate proper techniques for disassembly, maintenance, and assembly of a centrifugal pump.

 ONLINE | GPiLEARN+ COURSES

- MM0101: Centrifugal Pump Theories
- MM0102: Performance Issues in Centrifugal Pumps
- MM0104: Centrifugal Pump Components
- MM0106: Identification of Sealing Mediums Used in Pumps
- MM0107: Centrifugal Pump Disassembly
- MM0108: Centrifugal Pump Inspection
- MM0109: Identification of Defective Parts in Centrifugal Pumps
- MM0110: Centrifugal Pump Reassembly
- MM0112: Horizontal Single-Stage Centrifugal Pump Overhaul
- MM0113: Horizontal Multi-Stage Centrifugal Pump Overhaul
- MM0114: Vertical Single-Stage Centrifugal Pump Overhaul
- MM0115: Vertical Multi-Stage Centrifugal Pump Overhaul

POSITIVE DISPLACEMENT PUMPS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MM-205: Positive Displacement Pumps

- Discuss positive displacement pump laws.
- List and describe terminology associated with positive displacement pumps.
- Identify the major components of a positive displacement pump and describe its function.
- Demonstrate proper techniques for disassembly, maintenance, and assembly of a positive displacement pump.

 ONLINE | GPiLEARN+ COURSES

- MM1401: Pump Theories and Differences
- MM1403: Types of Safety Devices Used for Positive Displacement Pumps
- MM1404: Positive Displacement Pump Applications
- MM1405: Positive Displacement Pump Disassembly
- MM1406: Positive Displacement Pump Reassembly
- MM1407: Visual Inspection on Positive Displacement Pumps
- MM1408: Defective Part Replacement
- MM1409: Overhaul a Positive Displacement Pump
- MM1412: Piston Pump Overhaul
- MM1413: Diaphragm Pump Overhaul
- MM1414: Lobe Pump Overhaul
- MM1415: Vane Pump Overhaul
- MM1416: Liquid Ring Pump Overhaul



VALVE REPAIR

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

MM-210: Valve Repair

- Demonstrate proper valve disassembly and inspection.
- Demonstrate how to properly repair a valve seat.
- Identify and replace worn valve components.
- Demonstrate how to properly repack a valve.

 ONLINE | GPiLEARN+ COURSES

MM1306: Sealing Mediums Used in Valves

MM1307: Valve Disassembly

MM1308: Valve Inspections

MM1309: Replacement of Defective Parts That Are Critical in Valves

MM1310: Valve Part and Component Repair

MM1311: Valve Reassembly

MM1312: Globe Valve Overhaul

MM1313: Gate Valve Overhaul

MM1314: Safety Valve Overhaul

MM1315: Relief Valve Overhaul

MM1316: Ball Valve Overhaul

MM1317: Plug Valve Overhaul

MM1318: Diaphragm Valve Overhaul

MM1319: Butterfly Valve Overhaul

MM1320: Check Valve Overhaul

MM1321: Control Valve Overhaul

MM1324: Replacement of Defective Parts

CLUTCHES

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-220: Clutches

- Identify the various methods of clutch engagement.
- Identify the various types of clutches.
- Describe how to properly install a clutch and perform maintenance.

BELT DRIVES

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-225: Belt Drives

- List and describe the principles of operation of belt drives.
- Identify the types of belts and their uses.
- Demonstrate proper installation, alignment, and tensioning of belt drives.
- Discuss common drive failures.

 ONLINE | GPiLEARN+ COURSES

MM1208: Drive Belts Used in the Plant

MM1209: Use of Drive Belts (V-Belts, Gear Belts, Flat Belts)

MM1210: Sheaves Used in the Plant

MM1211: Use of Sheaves in the Plant

MM1212: Drive Belt Adjustments

MM1213: Drive Belt Replacement

CHAIN DRIVES

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-230: Chain Drives

- List and describe the principles of operation of chain drives.
- Identify the types of chains and their uses.
- Demonstrate the proper installation, alignment, and tensioning of chain drives.

2 APPLIED FUNDAMENTALS



GEARS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-235: Gears

- State the purpose of gears.
- Define the terminology associated with gears.
- Identify the following types of gear arrangements: spur gear, helical gear, herringbone gear, bevel gear, worm gear, and planetary gear.
- Demonstrate how to measure backlash in a gearing arrangement.

COUPLING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MM-240: Coupling

- Explain the purpose of a coupling.
- Explain the difference between a rigid and flexible coupling.
- Explain the following terms as they relate to a coupling: hub, shaft, key, match marks, bore, and gap.

 ONLINE | GPiLEARN+ COURSES

MM2306: The Function of Couplings and Major Coupling Types

SHAFT AND COUPLING ALIGNMENT

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

MM-245: Shaft and Coupling Alignment

- Identify the fundamental principles of shaft alignment.
- List and identify the tools used in the alignment process.
- Identify the phases of the alignment process.
- Demonstrate proper alignment methods.
- Discuss the factors that may affect alignment.
- Discuss the importance of alignment tolerances.
- Discuss the importance of using a pre-alignment checklist.
- Identify soft foot and discuss methods to correct it.
- Discuss methods used for non-standard alignments.
- Identify the coupling used to connect shafts.

 ONLINE | GPiLEARN+ COURSES

MM0901: Measurement of Coupling Hubs for Outside Diameter (OD) Offset and Face Angular Misalignment

MM0902: Procedure for Shimming to Compensate for Angular Face and Offset Outside Diameter (OD) Misalignment

MM0903: Alignment with Straight Edge and Taper Gauge

MM0904: Indicator Bar Sag Prevention Techniques

MM0905: Dial Indicator Setup and Graph Paper Plotting

MM0906: Determination of Misalignment Conditions

MM0907: Alignments to Within 0.002 Inch Tolerance

MM0908: Rim and Face Formulas

MM0909: Setup of Alignment Equipment to Instruction Booklet Specifications

MM0910: Calculation of the Formula to Determine Repositioning

MM0911: Alignment for Vertical and Horizontal Misalignment

MM0912: Reverse Alignment

MM2301: Shaft Alignment

MM2302: Identifying and Correcting Soft Foot

MM2303: Shaft Alignment Using Laser-Based Systems

MM2304: Laser Alignment Safety and System Operating Information

MM2305: Laser Alignment Troubleshooting

MM2306: The Function of Couplings and Major Coupling Types



PIPEFITTING



INSTRUCTOR-LED/HANDS-ON | 40 HOURS

MM-250: Pipefitting

- List and discuss codes and standards associated with pipe and tubing.
- Identify and discuss types of metal piping and their uses.
- Identify and discuss types of non-metallic piping and their uses.
- Identify and discuss types of tubing, including their installation and use.
- Describe the methods used for connecting pipes.
- Describe the components found in a piping system.
- Identify and discuss the types of pipe hangers and their applications.



ONLINE | GPiLEARN+ COURSES

IE1601: Tube Bending

IE1602: Selection of Proper Tubing Fittings for an Application

IE1603: Installation of Tubing Fittings

IE1604: Flare Tubing for Flare Fittings

IE1605: Installation of Tubing Supports and Hangers

IE1606: Selection of Tubing for Specific Applications

MM0603: Types of Piping

MM0604: Piping Applications

MM0605: Fittings

MM0606: Pipe Hangers and Support Systems

MM0607: Pipe Hangers and Support System Operation

MM0608: Pipe Joining Methods

MM0609: Fitting Applications

MM0610: Pipe Joining Applications

MM0611: Pipe Joining Methods Explained

MM0612: Use of Pipe Fittings

MM0613: Erecting Piping Runs

3 SITE SPECIFIC



HYDRAULICS APPLICATIONS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MM-300: Hydraulics Applications

- Describe hydraulic power and the components used in the design of hydraulic systems.
- Identify and explain common hydraulic components.
- Describe basic hydraulic theory.
- Replace hoses, seals, and fittings according to the guidelines identified in this training course.
- Explain common circuit applications.
- Describe preventive maintenance actions such as removing, replacing, and cleaning common hydraulic components.
- Interpret ANSI symbols and drawings to explain the functions of specific hydraulic systems.
- Troubleshoot common hydraulic components.

 ONLINE | GPiLEARN+ COURSES

- MM1701: Incompressibility of Fluids
- MM1702: Basic Components Common to Fluid Power Systems
- MM1703: Fluid Power System Diagramming
- MM1704: Purpose of Actuators
- MM1705: Basic Operations of an Actuator
- MM1706: Fluid Power System Control Valves
- MM1707: Valve Operation in Fluid Power Systems
- MM1708: Functions of Valves in Fluid Power Systems
- MM1709: Purpose of Accumulators
- MM1710: Types of Accumulators
- MM1711: Identification of Fluid Power Pumps
- MM1712: Operating Principles of Fluid Power Pumps
- MM1713: Fluid Power Pump Applications
- MM1714: Fluid Power Pump System Routine Maintenance
- MM1715: Identification of Fluid Power Motors
- MM1716: Operating Principles of Fluid Power Motors
- MM1717: Fluid Power Motor Applications
- MM1719: Identification of Fluids and Additives Used in Hydraulic Systems
- MM1720: Fluid Characteristics

- MM1721: Fluid Applications
- MM1722: Fluid Power System Reservoirs
- MM1723: Purpose of Filters
- MM1724: Hydraulic System Heat Exchangers
- MM1725: Fluid Power System Vendors Manuals
- MM1726: Identification of Fluid Power Component Malfunctions
- MM1727: Fluid Power System Problems and Possible Remedies
- MM1729: Location of Various Components of a Fluid Power System
- MM1730: Types of Repairs Made to Selected Fluid Power Components
- MM1731: Replacement of Parts and Fluid Power Components
- MM1732: Fluid Power Component Replacement
- MM1736: Fluid Power System Routine Maintenance Activities

PNEUMATICS APPLICATIONS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MM-305: Pneumatics Applications

- Describe pneumatic power and the components used in the design of pneumatic systems.
- Identify and explain common pneumatic components.
- Describe basic pneumatic theory.
- Replace hoses, seals, and fitting according to the guidelines identified in this training course.
- Describe preventive maintenance actions such as removing, replacing, and cleaning common pneumatic components.
- Interpret ANSI symbols and drawings to explain the functions of specific pneumatic systems.
- Troubleshoot common pneumatic components.

1 FUNDAMENTALS



BOLTS AND FASTENERS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MUL-100: Bolts and Fasteners

- Identify the standards associated with bolts and fasteners.
- Describe the different types of basic fasteners and their applications.
- Discuss the appropriate specification and selection criteria for fasteners.
- Describe the various types of locking devices in common use.
- Select the proper fastener for a given application.
- Demonstrate the proper torquing techniques for various mechanical fasteners.

 ONLINE | GPiLEARN+ COURSES

MM2405: Fasteners

MM1113: Measuring with a Depth Rule and a Depth Micrometer

MM1115: Measuring with a Protractor

MM1116: Measuring with a Dial Indicator

MM1118: Measuring with a Radius Gauge

MM1119: Measuring with a Thickness Gauge and a Taper Gauge

MM1121: Checking Concentricity

MM1122: Measuring with a Screw Pitch Gauge and a Thread Micrometer

MM1123: Measuring with a Wire and Sheet Metal Gauge

MM1124: Measuring with a Dial Caliper

MM2401: Non-Powered Hand Tools - Part 1

MM2404: Measuring Tools

MM2405: Fasteners

PRECISION MEASURING INSTRUMENTS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MUL-105: Precision Measuring Instruments

- Explain the purpose of precision measurement.
- List and discuss the terminology as it applies to precision measurement.
- Discuss the factors that affect measurement.
- Identify and demonstrate the proper use and application of precision measuring instruments.
- Apply and measure torque to fasteners.

 ONLINE | GPiLEARN+ COURSES

MM1102: Outside Micrometer Thimble Ratchet Use

MM1103: Precision Measuring "Feel"

MM1104: Micrometer "Zero" Calibration

MM1105: Outside Micrometer Measurements

MM1106: Measuring Device Orientation

MM1107: Vernier Scale Readings

MM1108: Measuring With a Vernier Caliper

MM1109: Measuring With an Inside Micrometer

MM1110: Measuring With a Small Hole Gauge

MM1111: Errors in Transferring Measurements

MM1112: Measuring with a Telescoping Gauge

LUBRICATION FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MUL-110: Lubrication Fundamentals

- Identify and explain lubrication maintenance strategies.
- Discuss the fundamentals and theory of lubrication.
- Describe the selection criteria for lubrication.

 ONLINE | GPiLEARN+ COURSES

MM0203: Identification of Lubrication Characteristics by Bearing Types

MM2201: Fundamentals of Lubrication

MM2203: Maintenance, Purification, and Filtration of Oil and Grease Lubricated Systems

1 FUNDAMENTALS



LUBRICANT APPLICATION AND ANALYSIS

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MUL-115: Lubricant Application and Analysis

- Discuss proper lubricant application and maintenance on lubricating systems.
- Explain the requirements for proper lubrication storage and management.
- Describe lubrication system filtering methods.
- List and explain lube oil sampling requirements.
- Identify and explain the factors affecting lubrication health.
- Describe common wear mechanisms associated with machines.

 ONLINE | GPiLEARN+ COURSES

MM0204: Proper Lubrication Techniques

MM2201: Fundamentals of Lubrication

MM2202: Lubrication Sampling Fundamentals

MM2203: Maintenance, Purification, and Filtration of Oil and Grease Lubricated Systems

MM2204: Failure Mode Indicators

MM2205: Lubricant Testing and Analysis

PIPING CORROSION PROTECTION

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

MUL-120: Piping Corrosion Protection

- Identify the different types of piping coating and their purpose.
- Describe galvanic corrosion and how to reduce or prevent deterioration of the pipe.
- Describe the application, inspection, and repair process for piping coatings.
- Describe the tape coating and heat shrink coating systems.

INTRODUCTION TO STEAM TURBINES

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MUL-125: Introduction to Steam Turbines

- Describe the function of a steam turbine.
- List and describe the major components of a steam turbine.
- Describe the basic operation of a steam turbine.
- Discuss factors that affect turbine operation.
- Discuss maintenance activities associated with a steam turbine.
- Troubleshoot common turbine problems.

 ONLINE | GPiLEARN+ COURSES

PF0205: Basic Turbine Overview

INTRODUCTION TO GAS TURBINES

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MUL-130: Introduction to Gas Turbines

- Describe the function of a gas turbine.
- List and describe the major components of a gas turbine.
- Describe the basic operation of a gas turbine.
- Discuss maintenance associated with a gas turbine.

 ONLINE | GPiLEARN+ COURSES

CC21G: Gas Turbine Generator (GE Frame 7F)

CC21S: Combustion Turbine (Siemens 501F)

CC22GA: Gas Turbine Main Components (GE Frame 7F) (Part 1)

CC22GB: Gas Turbine Main Components (GE Frame 7F) (Part 2)

CC22SA: Combustion Turbine Main Components (Siemens 501F) (Part 1)

CC22SB: Combustion Turbine Main Components (Siemens 501F) (Part 2)

CC23G: Gas Turbine Generator (GE Frame 7F)

CC23S: Combustion Turbine Generator (Siemens 501F)

CC24GA: Gas Turbine Support Systems (GE Frame 7F) (Part 1)

CC24GB: Gas Turbine Support Systems (GE Frame 7F) (Part 2)



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| CC24SA: Combustion Turbine Support Systems (Siemens 501F) (Part 1) | CT0303: Lube, Shaft, and Control Oil System and the Turning Gear (SGT5-2000E/V94.2) |
| CC24SB: Combustion Turbine Support Systems (Siemens 501F) (Part 2) | CT0304: Fuel Systems (SGT5-2000E/V94.2) |
| CC25GA: Gas Turbine Operations and Maintenance Considerations (GE Frame 7F) (Part 1) | CT0305: Combustion Turbine Control (SGT5-2000E/V94.2) |
| CC25GB: Gas Turbine Operations and Maintenance Considerations (GE Frame 7F) (Part 2) | PF0601: Combustion Turbines (GE LM2500) |
| CC25SA: Combustion Turbine Operations and Maintenance Considerations (Siemens 501F) (Part 1) | PF0602: Major Components of the Gas Turbine Assembly (GE LM2500) |
| CC25SB: Combustion Turbine Operations and Maintenance Considerations (Siemens 501F) (Part 2) | PF0603: Gas Turbine Lube and Control Oil Systems (GE LM2500) |
| CC26G: Gas Turbine Performance and Reliability (GE Frame 7F) | PF0604: Air Inlet, Fuel Supply, and Water Injection Systems (GE LM2500) |
| CC26S: Combustion Turbine Performance and Reliability (Siemens 501F) | PF0701: Combustion Turbines (GE Frame 6) |
| CC27S: TXP Control System (Siemens 501F) | PF0702: Starting Systems and Auxiliary Air Systems (GE Frame 6) |
| CT0101: Introduction to Gas Turbines (GE Frame 9FA) | PF0703: Lube, Hydraulic, and Control Oil Systems (GE Frame 6) |
| CT0102: Gas Turbine Main Components (GE Frame 9FA) (Part 1) | PF0704: Combustion Components and Fuel Systems (GE Frame 6) |
| CT0103: Gas Turbine Main Components (GE Frame 9FA) (Part 2) | PF0705: Generator Operations (GE Frame 6) |
| CT0104: Gas Turbine Generator (GE Frame 9FA) | PF0801: Combustion Turbines (GE Frame 7EA) |
| CT0105: Gas Turbine Support Systems (GE Frame 9FA) (Part 1) | PF0802: Starting System and Auxiliary Air Systems (GE Frame 7EA) |
| CT0106: Gas Turbine Support Systems (GE Frame 9FA) (Part 2) | PF0803: Lube, Hydraulic, and Control Oil Systems (GE Frame 7EA) |
| CT0107: Gas Turbine Operations and Maintenance Considerations (GE Frame 9FA) (Part 1) | PF0804: Combustion Components and Fuel Systems (GE Frame 7EA) |
| CT0108: Gas Turbine Operations and Maintenance Considerations (GE Frame 9FA) (Part 2) | PF0805: Generator Support Systems (GE Frame 7EA) |
| CT0109: Gas Turbine Performance and Reliability (GE Frame 9FA) | PF0901: Combustion Turbine (Siemens V84 2000E) |
| CT0201: Introduction to Combustion Turbines (SGT5-4000F/V94.3) | PF0902: Combustion Turbine Generator Starting and Air System (Siemens V84 2000E) |
| CT0202: Combustion Turbine Generator Starting and Air System (SGT5-4000F/V94.3) | PF0903: Lube, Shaft, and Control Oil System and the Turning Gear (Siemens V84 2000E) |
| CT0203: Lube, Shaft, and Control Oil System and the Turning Gear (SGT5-4000F/V94.3) | PF0904: Fuel Systems (Siemens V84 2000E) |
| CT0204: Fuel Systems (SGT5-4000F/V94.3) | PF0905: Combustion Turbine Control (Siemens V84 2000E) |
| CT0205: Combustion Turbine Control (SGT5-4000F/V94.3) | PF2205: Support Systems (GE LM6000) (Part 2) |
| CT0301: Introduction to Combustion Turbines (SGT5-2000E/V94.2) | PF2206: Operations and Maintenance (GE LM6000) (Part 1) |
| CT0302: Combustion Turbine Generator Starting and Air Systems (SGT5-2000E/V94.2) | PF2207: Operations and Maintenance (GE LM6000) (Part 2) |
| | PF2208: Performance and Reliability (GE LM6000) |
| | PF2209: Control System (GE LM6000) |

2 APPLIED FUNDAMENTALS



SCAFFOLDING

 INSTRUCTOR-LED/HANDS-ON  | 16 to 24 HOURS

MUL-200: Scaffolding

- Explain the requirements set forth by OSHA part 1910 and part 1926 regulations.
- Identify safety hazards associated with scaffolding.
- Identify the types and uses of scaffolding.
- Discuss procedures, precautions, limitations, and practices surrounding the aspects of erecting, using, and dismantling fabricated frame scaffolding.
- Discuss case reports from OSHA files.
- Safely erect and dismantle a two-tier scaffold following OSHA regulations.

 ONLINE | GPiLEARN+ COURSES

ND-SCF-1.0: Scaffold Safety

OS2101: Scaffold Safety - Module 1

OS2102: Scaffold Safety - Module 2

RIGGING

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MUL-205: Rigging

- Identify the safety hazards associated with rigging.
- Identify and describe rigging gear.
- Discuss the fundamentals of rigging.
- Discuss methods used to determine the weight of a load.
- Demonstrate methods used for moving and manipulating loads.

 ONLINE | GPiLEARN+ COURSES

MM1008: Proper Use of the "Riggers" Handbook

MM1009: Safe Working Loads for Various Types of Slings and Hardware

MM1010: Types of Rigging and Lifting Equipment

MM1012: Planning a Rigging and Lifting Job

MM1014: Proper Use of Rigging and Lifting Equipment

3 SITE SPECIFIC



ELECTRIC OVERHEAD TRAVELING (EOT) CRANE INSPECTION

 INSTRUCTOR-LED/HANDS-ON  | 16 HOURS

MUL-300: Electric Overhead Traveling (EOT) Crane Inspection

- Identify and discuss the major assemblies of EOT cranes.
- List the inspection points on an EOT crane.
- Locate the inspection points on an EOT crane.
- Discuss the criteria for the inspection points.

 ONLINE | GPILEARN+ COURSES

OS0801: Cranes - Module 1

DIRECT CURRENT (DC) CRANE CONTROLS

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

MUL-305: Direct Current (DC) Crane Controls

- Identify and explain component layout of a crane.
- Describe the function and operation of electrical components associated with DC cranes.
- List and describe the purpose of components located in a DC power control system.
- Describe the operation of DC motors.
- Analyze a DC schematic to determine failed component.
- Demonstrate proper troubleshooting techniques.
- Demonstrate proper maintenance associated with cranes.

 ONLINE | GPILEARN+ COURSES

EL0701: Operating Characteristics of Various Types of Motors

EL0702: Types of Motors

MM1016: Safe Performance of Lifts Using Electric-Powered Lifting Devices

CRANE BRAKES

 INSTRUCTOR-LED/HANDS-ON  | 16 to 24 HOURS

MUL-310: Crane Brakes

- Explain the operation of overhead crane brakes.
- Describe maintenance activities associated with overhead crane brakes.
- Implement proper troubleshooting techniques associated with overhead crane brakes.

1 FUNDAMENTALS



ARTICULATED DUMP TRUCK OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-100: Articulated Dump Truck Operation

- Describe the safety rules associated with articulated dump truck operation.
- Identify the controls and functions on the articulated dump truck control panels.
- Perform a vehicle inspection.
- Describe basic techniques for using the articulated dump truck.

TRACTOR DOZER OPERATION AND TECHNIQUES

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-105: Tractor Dozer Operation and Techniques

- Locate and identify the safety warning labels on the dozer.
- Describe the safety rules associated with the dozer operation.
- Perform a Visual Walk-around using the Dozer Inspection sheet.
- Complete the Mobile Equipment Pre-Shift Inspection sheet.
- Identify all console equipment.
- Identify all control equipment.
- Perform a pre-start check of the dozer.
- Perform an engine start-up.
- Perform an engine and machine warm-up.
- Drive the dozer.
- Operate the blade in all directions.
- Plow with a straight blade.
- Plow with a tilt right blade.
- Plow with a tilt left blade.
- Stop and park the machine.
- Stop the engine.
- Leave the machine.
- Perform operator maintenance tasks.

FLATBED TRUCK OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-110: Flatbed Truck Operation

- Describe the safety rules associated with flatbed truck operation.
- Identify the controls and functions on the flatbed truck control panels.
- Perform a vehicle inspection.
- Describe basic techniques for using the flatbed truck.
- Perform basic operations with the flatbed truck.

PAYLOADER OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-115: Payloader Operation

- Describe the safety rules associated with payloader operation.
- Identify the controls and functions on the payloader control panels.
- Perform a vehicle inspection.
- Describe basic techniques for using the payloader.

TRACTOR TRAILER OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-120: Tractor Trailer Operation

- Describe the safety rules associated with tractor trailer operation.
- Identify the controls and functions on the tractor trailer control panels.
- Perform a vehicle inspection.
- Describe basic techniques for using the tractor trailer.



TRACTOR/LOADER/ BACKHOE OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

HEO-125: Tractor/Loader/Backhoe Operation

- Describe the safety rules associated with the Tractor/Loader/Backhoe (TLB) operation.
- Identify the controls and functions on the TLB control panels.
- Perform a vehicle inspection.
- Describe basic techniques for using the TLB.

TRAIN-THE-TRAINER

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

TTT-100: Train-The-Trainer

- Analyze key factors for planning and preparing training delivery.
- Select and utilize effective motivational techniques.
- Use appropriate introductory techniques for opening a lesson.
- Practice effective presentation and facilitation skills.
- Select and use effective strategies for summarizing and evaluating a lesson or a course.

0 FOUNDATIONAL



WRITING PLANT OPERATING PROCEDURES

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

WPOP-000: Writing Plant Operating Procedures

- Describe the two criteria that determine a procedure's effectiveness.
- List the three stages of the procedure development process.
- State the roles and responsibilities of the writer, users, and reviewer in the procedure development process.
- Describe the four elements of the communication cycle.
- Describe how the medium affects the readability of a procedure.
- Explain the three stages of the procedure writing process.

1 FUNDAMENTALS



NUCLEAR ACAD – MATHEMATICS

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-101: Nuclear ACAD – Mathematics

- Basic Math
- Algebraic operations, equations, and word problems
- Systems of equations and quadratic equations
- Scientific notation and logarithms
- Graphing
- Plane and solid geometry
- Trigonometry
- Scalar and vector quantities

NUCLEAR ACAD – CLASSICAL PHYSICS

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-102: Nuclear ACAD – Classical Physics

- Units and measurements
- Velocity and acceleration
- Gravity and Newton's law
- Momentum
- Work
- Energy and conservation of energy power

NUCLEAR ACAD – HEAT TRANSFER

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-103: Nuclear ACAD – Heat Transfer

- Thermodynamic units and properties
- Heat and heat transfer
- Steam
- Fluid flow
- Heat exchangers

NUCLEAR ACAD – MECHANICAL SCIENCE

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-104: Nuclear ACAD – Mechanical Science

- Valves
- Pumps
- Heat exchangers
- Steam traps
- Filters and strainers
- Air compressors
- Refrigeration machines
- Heating, ventilation, and air conditioning (HVAC)
- Lubrication principles
- Steam turbines
- Diesel engines
- Hangers and snubbers

NUCLEAR ACAD – ELECTRICAL SCIENCE

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-105: Nuclear ACAD – Electrical Science

- Basic electrical theory
- Voltage production
- Basic DC theory and circuits
- DC circuit inductance and capacitance
- DC generators
- DC motors
- Batteries
- Basic AC theory
- Basic AC reactive components
- Three phase power
- AC generators and transformers
- AC motors
- Electrical test instruments and measuring devices
- System components and protection devices
- Basic electronics

1 FUNDAMENTALS



NUCLEAR ACAD – INSTRUMENTATION & CONTROL

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-106: Nuclear ACAD – Instrumentation & Control

- Instrumentation and control concepts
- Temperature sensors and detectors
- Pressure sensors and detectors
- Level sensors and detectors
- Flow sensors and detectors
- Valve actuators and position indicators
- Miscellaneous sensors and detectors
- Chemistry instrumentation
- Radiation detectors

NUCLEAR ACAD – CHEMISTRY

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-107: Nuclear ACAD – Chemistry

- Chemistry principles I
- Chemistry principles II
- Acids and bases
- Demineralizers and ion exchangers
- Primary coolant chemistry
- Corrosion
- Chemistry hazards

NUCLEAR ACAD – MATERIAL SCIENCE

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-108: Nuclear ACAD – Material Science

- Structures of metals
- Properties of metals
- Plant materials
- Brittle fracture
- Thermal shock

NUCLEAR ACAD – NUCLEAR SCIENCE

 INSTRUCTOR-LED/HANDS-ON  | VARIES

ACAD-109: Nuclear ACAD – Nuclear Science

- Components, structure, and identification of the atom
- Mass defect and binding energy
- Radioactive decay and neutron interactions
- Nuclear cross-section, fission, and neutron classification
- Neutron life cycle
- Delayed neutrons and reactor kinetics
- Coefficients
- Plant operations

NUCLEAR GENERAL FUNDAMENTALS – PLANT COMPONENTS

 INSTRUCTOR-LED/HANDS-ON  | VARIES

GENFN-101: Nuclear General Fundamentals – Plant Components

- Valves
- Pumps
- Heat exchangers and condensers
- Ion exchangers and demineralizers
- Motors and generators
- Breakers, relays, and disconnects
- Sensors and detectors
- Controllers and positioners

NUCLEAR GENERAL FUNDAMENTALS – REACTOR THEORY

 INSTRUCTOR-LED/HANDS-ON  | VARIES

GENFN-102: Nuclear General Fundamentals – Reactor Theory

- Neutrons
- Neutron life cycle
- Reactor kinetics
- Reactivity coefficients
- Control rods
- Fission product poisons
- Fuel depletion and burnable poisons
- Reactor operational physics




NUCLEAR GENERAL FUNDAMENTALS – THERMODYNAMICS

 INSTRUCTOR-LED/HANDS-ON  | VARIES

GENFN-103: Nuclear General Fundamentals – Thermodynamics

- Thermodynamic properties and units
- Basic energy concepts
- Steam
- Thermodynamic process
- Thermodynamic cycle
- Fluid statics and dynamics
- Heat transfer and heat exchangers
- Thermal hydraulics
- Core thermal limits
- Brittle fracture and core vessel stresses

CHEMISTRY FOR OPERATORS

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

CFO-100: Chemistry for Operators

- Describe basic concepts of plant water chemistry.
- Describe the causes and effects of corrosion.
- Describe the methods used to control and prevent corrosion.
- Describe types of water treatment technologies and their applications.
- Explain plant chemistry control methods and their applications.
- Relate typical plant chemistry transients to probable causes and corrective actions.
- Identify basic types and uses of in-line instruments.

 ONLINE | GPiLEARN+ COURSES

IE0609: Use of Analyzers

PF0301: Units of Measurement

PF1801: Introduction to Chemistry

PF1803: Scale, Deposit, and Fouling

PF1903: Gaseous Emissions Control

NA01: Cooling Water Basics

NA02: Cooling Towers

NA03: Chillers

NA04: Advanced Cooling Water Problems and Solutions: Corrosion

COMBINED CYCLE FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

CCF-100: Combined Cycle Fundamentals

- Discuss the laws of thermodynamics and energy conversion.
- Use a steam table to look up the properties of steam and water.
- Explain the primary flow paths for fuel, air, steam cooling water, and power.
- Discuss the general purpose and basic operation of various plant systems.
- Describe the purpose and primary function of each major component.
- Discuss the sequence of events for a plant start-up and shutdown.
- Discuss the current trends in combined cycle generation.

 ONLINE | GPiLEARN+ COURSES

CC11: Combined Cycle Fundamental Theory and Operation (GE Frame 7F and Siemens 501F)

CC12: Cycle Parameters and Their Impact on Plant Performance (GE Frame 7F and Siemens 501F)

CC13: Benefits of the Combined Cycle (GE Frame 7F and Siemens 501F)

CC14: Fuels for Combined Cycle Power Plants (GE Frame 7F and Siemens 501F)

CC21G: Gas Turbine Generator Introduction (GE Frame 7F)

CC31: HRSG Overview, Principles, and Flow Paths

CC32: HRSG Major Components

CC33: HRSG Water Chemistry Control, and SCR and Non-SCR NOx Control Overview

CC41: Steam Turbine Principles, Components, and Support Systems

CC42: Steam Turbine Generator

CC51: Gas Turbine Controls

CC52: HRSG Controls

CC53: Steam Turbine Controls

CC54: Generator Controls

CC55: GE Mark V/VI Control Systems

CC61: Startup Considerations

CC62: Operating Modes


CC64: Shutdown of Combined Cycle Plants

CC65: Layup

1 FUNDAMENTALS



INDUSTRIAL BOILERS

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

IB-100: Industrial Boilers

- Discuss steam and water properties.
- Discuss basic concepts of heat transfer and metallurgy.
- Explain boiler and steam water circuits, boiler components, and flue gas flow paths.
- Describe the purpose and basic operation of boiler support equipment.
- Describe the control process, measurements, and burner management control systems.
- Describe plant start-ups, shutdowns, and abnormal operations.
- Describe the operation and safety considerations of a steam distribution system.

 ONLINE | GPiLEARN+ COURSES

PF0201: Energy Conversion Process

PF0204: Boiler Water/Steam Cycle

PF0304: Fuels

PF0403: Heat Transfer

PF1001: Steam Drums

PF1002: Waterwall Circulation, Superheaters, and Drains

PF1003: Economizer, Reheater, Gas Flow, Attenuation, Sootblowing

PF1803: Scale, Deposit, and Fouling

PF2101: Introduction to Performance

PF2102: Boiler Efficiency

PF2104: Miscellaneous Losses

INTRODUCTION TO SCRUBBER OPERATION

 INSTRUCTOR-LED/HANDS-ON  | 2 DAYS

ISO-100: Introduction to Scrubber Operation

- Identify provisions of the Clean Air Act Amendments of 1980.
- Identify FGD Systems designed to reduce SO₂ emissions.
- Identify properties and production processes of lime and limestone.
- Identify the different types of scrubbers to include design considerations.
- Recall operating characteristics of Lime and Limestone Handling and Preparation Systems.
- Identify operating characteristics of Absorber Systems (liquid side).
- Identify operating characteristics of Waste Removal and Dewatering Systems.
- Identify operating characteristics of Sludge Disposal Systems.
- Identify operating characteristics of flue gas reheaters.
- Identify operating characteristics of Particulate Removal Systems.
- Identify control, operation, and maintenance methods for scrubbers.

 ONLINE | GPiLEARN+ COURSES

FG01: Nitrogen Oxide and Sulfur Oxide Emissions

FG03: Flue Gas Desulfurization

PF1903: Gaseous Emissions Control



POWER PLANT FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 4 DAYS



PPF-100: Power Plant Fundamentals

- Restate the laws of thermodynamics and energy conversion.
- Recognize process and instrument diagrams.
- Use a steam table to look up the properties of steam and water.
- Describe the purpose and primary function of each major component.
- Discuss the general purpose and basic operation of a boiler, steam turbine, and generator.

 ONLINE | GPiLEARN+ COURSES

- EL0101: Classifications of Prints and Drawings
- EL0109: Tracing of Flow Paths of Plant Piping and Instrumentation Diagrams (P&IDs)
- PF0201: Energy Conversion Process
- PF0202: Combustion System Components
- PF0204: Boiler Water/Steam Cycle
- PF0205: Basic Turbine Overview
- PF0206: Plant Auxiliary Systems
- PR0207: Introduction to Power Plant Efficiency and Heat Rate
- PF1501: Practical Basic Electricity
- PF1502: Alternating Current (AC) Electricity and Generators
- PF1503: Basic Generator/Exciter Operation

RELAY PROTECTION FOR OPERATORS

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY

RPO-100: Relay Protection for Operators

- Describe the role protective relays play in an electrical power system.
- Describe the construction and operation of electromechanical and solid state relays.
- Identify National Electrical Manufacturers Association (NEMA) protective relay device numbers.
- Explain relay coordination, including zones of protection.
- List and categorize the general types of protective relay devices.
- Describe how fuses and overcurrent relays operate and identify typical applications.
- Describe how frequency relays operate and identify applications.

 ONLINE | GPiLEARN+ COURSES

PF1603: General Relaying

1 FUNDAMENTALS



LARGE STEAM TURBINE-GENERATOR OPERATIONS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

STG-100: Large Steam Turbine-Generator Operations

- Describe the steam flow path through a large steam turbine.
- Discuss the major turbine components.
- Describe the function of the major valves for the steam turbine.
- List and describe the operation of the support systems associated with the steam turbine.
- Discuss the importance of turbine supervisory instrumentation and list the major components monitored.
- Explain the construction and operation of a generator.

 ONLINE | GPiLEARN+ COURSES

- OP0101: Major Components of an Alternating Current (AC) Generator
- OP0102: Principles of an Alternating Current (AC) Generator
- OP0103: Auxiliary Systems of an Alternating Current (AC) Generator
- OP0104: Basic Alternating Current (AC) Power Calculations
- OP0201: Complete Startup of Turbine/Generator
- OP0202: Complete Shutdown of Turbine/Generator
- OP0203: SALI Charts With or Without Rotor Stress Indicator (RSI)
- OP0204: Operating Limits of Turbine/Generator
- OP0205: Purpose of Turbine Components and Instrumentation
- OP0206: Operation of Turbine Components
- OP0207: Purpose of Generator Components and Instrumentation
- OP0208: Operation of Generator Components
- OP0211: Corrective Action for Transient Conditions
- OP0701: Purpose of Generators
- OP0702: Major Components of Generators
- OP0705: Interaction of Associated Transformers With Generators

OP0706: Systems of Generators Cooled by the Cooling Water System

OP0707: Operation of Stator Cooling Systems

OP0708: Major Components of the Generator Seal Oil System

OP0709: Flow Path of the Seal Oil System

OP0710: Power Sources of Generator Seal Components

OP0711: Major Components of the Generator Bearing Oil System

OP0712: Flow Path of the Generator Bearing Oil System

OP0713: Power Sources of the Generator Bearing Oil System Components

OP0715: Components of the Generator Hydrogen System

OP0716: Power Sources of the Generator Hydrogen System

OP0717: Purging of the Generator With Air, Carbon Dioxide, and Hydrogen

OP0718: Power Sources of Generator Major Components

OP0719: Safety Features of the Generator

OP0721: Isolating and Tagging of Generator Components

OP0722: Major Subsystems of the Generator

OP0724: Conditions Required to Synchronize the Generator

OP0901: Function of the Main Steam Turbine

OP0902: Turbine Steam Valves

OP0904: Flow Path of Steam Through the Turbine

OP0905: Two Types of Turbine Bearings

OP0906: Functions of Subsystems of the Turbine

OP0907: Major Components of the Turbine and Their Function

OP0909: Components of the Turbine Front Standard

OP0911: Components of the Turbine Lube Oil System

OP0912: Flow Path of the Turbine Lube Oil Systems

OP0913: Flow Path of the Turbine Lube Oil Filtration

OP0914: Effect of High Backpressure on Turbine Operation

OP0915: Turbine Supervisory Instrumentation and Function



- OP0916: Condenser Vacuum Effects on Turbine Operation
- OP0917: Power Sources for Turbine Components
- OP0918: Safety Features of the Turbine
- OP0920: Function of the Turbine Exhaust Hood Spray
- OP0921: Function of the Turbine Steam Seal System
- OP0922: Isolation and Tagging of the Turbine Components
- OP0923: Function of the Condenser Tube Spray System

UTILITY BOILER OPERATIONS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

UBO-100: Utility Boiler Operations

- Discuss steam and water fundamentals, heat transfer concepts, and basic metallurgy.
- Describe factors affecting plant efficiency.
- Discuss the operation of boiler auxiliary equipment.
- Describe different types of process controls for boilers and turbines.

 ONLINE | GPiLEARN+ COURSES

- PF0201: Energy Conversion Process
- PF0202: Combustion Systems Components
- PF0204: Boiler Water and Steam Cycle
- PF0207: Introduction to Power Plant Efficiency and Heat Rate
- PF0304: Phases and States of Matter
- PF0401: Fuels
- PF0402: Chemistry of Combustion
- PF0403: Heat Transfer
- PF0501: Introduction to Ash Handling
- PF1001: Steam Drums
- PF1002: Waterwall Circulation, Superheaters, and Drains
- PF1003: Economizer, Reheater, Gas, Flow, Attemperators, and Sootblowing
- PF1701: Power Plant Controls
- PF2102: Boiler Efficiency

2 APPLIED FUNDAMENTALS



COMBINED CYCLE ABNORMAL CONDITIONS

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

CCAC-200: Combined Cycle Abnormal Conditions

- Identify the possible causes for typical casualties.
- Explain the potential consequences.
- Describe the most effective immediate operator responses.
- Discuss the probable follow-up operator responses.

 ONLINE | GPiLEARN+ COURSES

CC63: Abnormal Plant Operations

(Prerequisites: CC24GA, CC24GB, CC25GA, CC25BG, CC26G)

EFFECTIVE SIMULATOR INSTRUCTION

 INSTRUCTOR-LED/HANDS-ON  | 2.5 DAYS

ESI-200: Effective Simulator Instruction

- Identify the different approaches for dealing with individual differences relating to teaching adults.
- Identify how to work with each student to clearly define the objectives and expectations, including the students' own objectives and expectations.
- Identify the attributes of an instructor and evaluator and how they relate to effective completion of simulator activities.
- Identify the process and attributes of creating realistic simulator scenarios that effectively engage the students to accomplish specific goals.


CLASSROOM INSTRUCTOR TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 2.5 DAYS

CIT-200: Classroom Instructor Training

- Recognize and deal with individual differences.
- Provide effective presentations.
- Establish direction and purpose for training.
- Identify, select, and apply various instructional methods and support materials.
- Explain the steps for performing a training needs analysis and task analysis.
- Explain the steps for developing training program objectives and lessons.
- Validate training program materials.
- Implement training programs.

OPERATIONAL LEADERSHIP AND MANAGEMENT SKILLS

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

OLMS-200: Operational Leadership and Management Skills

- Describe effective techniques for assembling a team.
- Explain how a team leader should be selected.
- Describe effective team communication techniques.
- Describe basic techniques for managing conflict.
- Discuss ways to optimize team performance.



PLANT ABNORMAL CONDITIONS



INSTRUCTOR-LED/HANDS-ON | 3 DAYS

PAC-200: Plant Abnormal Conditions

- Identify the possible causes for typical casualties.
- Explain the potential consequences.
- Describe the most effective immediate operator response.
- Discuss the probable follow-up operator responses.



ONLINE | GPiLEARN+ COURSES

OP0405: Corrective Actions for Various Transient Conditions

OP0407: Operating Limits of Boilers and Boiler Components

OP0408: Safety Valves of the Boiler

OP0409: Pressure Range Where the Boiler Safety Valves Lift

OP0411: Operation of the Furnace Safeguard Supervisory System (FSSS)

OP0509: Safety Features of the Fuel System

OP0510: Functions of the Safety Features of the Fuel System

OP0609: Safety Features and Their Function in the Circulating Water System

OP0719: Safety Features of the Generator

OP0806: Precipitator Safety

OP0918: Safety Features of the Turbine

OP1015: Functions of the Safety Features of the Fans

OP1017: Safety Concerns and Protective Features and Functions of the Air Preheaters

OP1108: Safety Features of the Sootblowing System

OP1210: Safety Features of Boilers

OP1211: Function of the Boiler Safety Features

OP1312: Function of Safety Features of the EHC System

OP1508: Safety Features of the Pulverizers and Feeders

OP1509: Safety Feature Functions of the Pulverizers and Feeders

OP1510: Inerting Steam Operation

3 SITE SPECIFIC



ADVANCED PERFORMANCE ANALYSIS AND TROUBLESHOOTING FOR POWER PLANTS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

APA-300: Advanced Performance Analysis and Troubleshooting for Power Plants

- Recognize the principles of thermodynamics and heat transfer.
- Identify where thermal losses occur.
- Determine if problems are due to equipment or operations difficulties
- Act to effectively control heat rate
- Monitor improvements and continually reassess strategies for optimum performance.

 ONLINE | GPiLEARN+ COURSES

CC11: Combined Cycle Fundamental Theory and Operation (GE Frame 7F and Siemens 501F)

CC12: Cycle Parameters and Their Impact on Plant Performance (GE Frame 7F and Siemens 501F)

COMBINED CYCLE POWER PLANT PERFORMANCE

 INSTRUCTOR-LED/HANDS-ON  | 2.5 DAYS

CCPPP-300: Combined Cycle Power Plant Performance

- Identify and diagnose root causes of capacity and efficiency degradation.
- Quantify the benefits of performance recovery.

 ONLINE | GPiLEARN+ COURSES

CC11: Combined Cycle Fundamental Theory and Operation (GE Frame 7F and Siemens 501F)

CC12: Cycle Parameters and Their Impact on Plant Performance (GE Frame 7F and Siemens 501F)

FUNDAMENTALS OF POWER PLANT PERFORMANCE FOR UTILITY ENGINEERS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

FPPP-300: Fundamentals of Power Plant Performance for Utility Engineers

- Recognize and use standard testing methods.
- Determine the performance levels of major plant equipment.
- Test performance accurately and interpret results.
- Improve the efficiency of plant operations.

HEAT RATE AWARENESS

 INSTRUCTOR-LED/HANDS-ON  | 2.5 DAYS

HRA-300: Heat Rate Awareness

- Discuss the details of heat rate concepts.
- Explain controllable and non-controllable losses.
- Explain the effects of component performance on operating costs.
- Discuss how heat rate affects operating practices, unit optimization, and environmental compliance.

 ONLINE | GPiLEARN+ COURSES

HR01: Concern for Efficiency

HR02: First Law of Thermodynamics and Entropy

HR03: Heat Rate

HR04: Energy Transfer and Efficiency

HR05: Boiler, Turbine, and Generator Efficiency

HR06: Boiler Efficiency

HR07: Boiler Testing

HR08: Efficiency - Calculations and Air Heater Testing

HR09: Turbine Cycle Efficiency

HR1001: Cycle Isolation

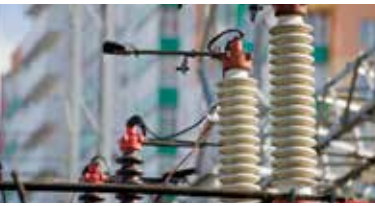
HR1002: Equipment Losses

PF2101: Introduction to Performance

PF2102: Boiler Efficiency

PF2103: Turbine Cycle Performance

PF2104: Miscellaneous Losses



SIMULATOR-BASED COMBINED CYCLE PLANT OPERATIONS

 INSTRUCTOR-LED/HANDS-ON  | 4.5 DAYS

SBCC-300: Simulator-Based Combined Cycle Plant Operations

- Prepare the combined cycle unit for start-up.
- Start up the unit following normal operating practices.
- Change from simple cycle to combined cycle configuration and back.
- Properly operate the unit under routine conditions and load changes.
- Prepare the combined cycle for shutdown.
- Shut down the unit following normal operating practices.
- Interpret alarms and their relationships quickly.
- Effectively respond to abnormal operating conditions, including GT flame out, HRSG tube leaks, unit runbacks, etc.

 ONLINE | GPiLEARN+ COURSES

- SMCC0001: How to Use Human Machine Interface (HMI) Graphics
- SMCC0002: How to Use the Intelligent Tutoring System (ITS)
- SMCC0003: How to Use the Alarm Panel
- SMCC0101: Startup of the Cooling Water Systems
- SMCC0102: Startup of the Gas and Steam Turbine Auxiliaries
- SMCC0103: Startup of the Condensate System and Establishing a Water Level in the LP Drum
- SMCC0104: Startup of the Feedwater System and Establishing a Water Level in the IP and HP Steam Drums
- SMCC0105: Lineup of the Lead HRSG Steam Systems
- SMCC0106: Gas System Lineup and Preparation for Gas Turbine Startup

- SMCC0107: Startup of the Auxiliary Steam System and Establishing Condenser Vacuum
- SMCC0108: Startup of a Gas Turbine to 10 MW
- SMCC0109: Heat Up HRSG and Establish Steam Conditions for a Cold Turbine Roll
- SMCC0110: Startup of a Cold Steam Turbine to 5 MW
- SMCC0111: Cold Steam Turbine Forward Flow Shift and Establish Inlet Pressure Control
- SMCC0112: Startup of a Hot Steam Turbine to Inlet Pressure Control in Service
- SMCC0113: Lead Gas Turbine Ramp to Base Load
- SMCC0114: Lineup of the Lag HRSG Steam and Gas Path for Gas Turbine 2 Startup
- SMCC0115: Startup of the Lag Gas Turbine to 40 MW
- SMCC0116: Lag Gas Turbine Loading and HRSG Steam Blending
- SMCC0117: Gas Turbine and Steam Turbine Load Ramp to Base Load
- SMCC0118: Start Up HRSG Duct Burners and Establish Full Unit Loading
- SMCC0119: Integrated Unit Startup
- SMCC0301: Unit Shutdown to Minimum SCR Operation
- SMCC0302: Unit Overnight Shutdown
- SMCC0303: Unit Shutdown for Scheduled Maintenance Outage
- SMCC0304: Single Gas Turbine and HRSG Shutdown for Maintenance
- SMCC0401: Gas Turbine Trip and Restart
- SMCC0402: Steam Turbine Trip and Restart
- SMCC0403: Boiler Feed Pump Trip
- SMCC0404: Condensate Pump Trip
- SMCC0405: Gas Turbine Combustor Problems
- SMCC0406: LP Steam Drum Level Control Problems
- SMCC0407: Loss of Main Condenser Vacuum
- SMCC0408: Main/Reheat Steam Temperature Control Problems
- SMCC0409: Gas Supply Pressure and Temperature Problems

3 SITE SPECIFIC



SIMULATOR-BASED COAL-FIRED PLANT OPERATIONS

 INSTRUCTOR-LED/HANDS-ON  | 5 DAYS

SBCF-300: Simulator-Based Coal-Fired Plant Operations

- Explain the characteristics and flow paths of a coal-fired plant.
- Describe all major plant systems.
- Identify the sequence of major events during plant startup and shutdown.
- Discuss current coal-fired plant activities, trends, and technologies.
- Use the high-fidelity coal-fired simulator to start the plant from cold conditions, operate the plant over various load conditions, and shut down the plant.
- Determine if a tube leak exists.
- Identify where the leak is most likely to be located.
- Estimate the extend of the leakage.
- Determine factors for subsequent actions

SIMULATOR-BASED GAS-FIRED BOILER PLANT OPERATIONS

 INSTRUCTOR-LED/HANDS-ON  | 9.5 DAYS

SBGF-300: Simulator-Based Gas-Fired Boiler Plant Operations

- Preparing the gas-fired unit for startup.
- Starting up the unit following normal operating practices.
- Properly operating the unit under routine conditions and load changes.
- Preparing the unit for shutdown.
- Responding to boiler/turbine trip and performing recovery.
- Interpreting alarms and their relationships quickly.
- Effectively responding to abnormal operating conditions, including a loss of condensate pumps, boiler feed pumps, boiler fans, air heater drives, boiler tube leaks, unit runbacks, etc.

0 FOUNDATIONAL



ACCOUNTABILITY

 INSTRUCTOR-LED | 4 HOURS

PDS-001: Accountability

- Define accountability, responsibility, and empowerment.
- Rate yourself and your team on the PowerMeter.
- Discuss the Account-Able Choice.
- Identify obstacles to being accountable.
- Speak the language of empowerment and accountability.
- Apply a five-step model to create accountability in others.

COMMUNICATE WITH CLARITY

 INSTRUCTOR-LED | 8 HOURS

PDS-002: Communicate With Clarity

- Describe the five steps to creating open communication.
- Assess communication skills and identify areas of strength and development.
- Determine the most appropriate method for sharing messages.
- Demonstrate the appropriate nonverbal skills to enhance communication with others.
- Create assertive statements.
- Apply open-ended questioning techniques to increase two-way communication.
- Use active listening skills to improve rapport and productivity in the working environment.
- Respond effectively when receiving feedback.

DELEGATION

 INSTRUCTOR-LED | 4 HOURS

PDS-003: Delegation

- Define delegation.
- Break your personal barriers to delegation.
- Apply situational leadership to delegation.
- Decide the tasks to delegate and the tasks to keep.
- Determine the right person to whom to delegate the task.
- Plan and conduct a four-step delegation meeting.
- Follow up on a delegated task.
- Obtain the results you expect from a delegated task.

EMOTIONAL INTELLIGENCE

 INSTRUCTOR-LED | 8 HOURS

PDS-004: Emotional Intelligence

- Define emotional intelligence and how it relates to personal and organizational success.
- Apply tools to increase personal skills: self-awareness and self-management of personal emotions.
- Analyze and interpret online assessment results from the EQ-I Inventory.
- Apply tools to increase social skills: recognizing the emotions in others and responding to those emotions.

FACILITATING EFFECTIVE MEETINGS

 INSTRUCTOR-LED | 4 HOURS or 8 HOURS

PDS-005: Facilitating Effective Meetings

- Apply four steps to successfully facilitate meetings.
- Create an effective purpose statement.
- Identify intended outcomes to achieve the purpose.
- Develop an agenda that is focused on achieving intended outcomes.
- Understand the logistics of setting up a meeting.
- Apply three tools that keep a meeting on track.
- Resolve challenging attendee behaviors.
- Utilize a method for reviewing a meeting that achieves results on action items.

GIVING AND RECEIVING FEEDBACK

 INSTRUCTOR-LED | 4 HOURS

PDS-006: Giving and Receiving Feedback

- Define feedback.
- Understand the importance of the approach to giving feedback.
- Identify guidelines for giving feedback.
- Demonstrate the ability to use observation versus judgment.
- Apply steps to giving constructive feedback.
- Apply steps to giving positive feedback
- Apply guidelines for receiving feedback.

0 FOUNDATIONAL



MANAGING CONFLICT

 INSTRUCTOR-LED | 4 HOURS or 8 HOURS

PDS-007: Managing Conflict

- Recognize the five styles of conflict resolution and how to best adapt your style and approach to a conflict situation.
- Understand your preferred style of conflict resolution.
- Apply the Stop, Yield, Go Model to collaborative conflict resolution.
- Apply techniques to managing emotions during conflict.
- Explain assumptions and their effect on conflict.
- Use active-listening skills to improve the working environment.
- Apply assertive language techniques to express your needs and respect the needs of others.

HIRING TALENT: RIGHT PERSON, RIGHT JOB

 INSTRUCTOR-LED | 8 HOURS

PDS-008: Hiring Talent: Right Person, Right Job

- Recognize the importance of selecting the right candidate.
- Calculate the cost of turnover.
- Explain the organization's hiring process.
- Apply a four-step interviewing process.
- Identify job competencies and value behaviors for an open position.
- Create behavior-based interview questions.
- Conduct an effective selection interview.
- Decide on the best candidate.

LEADING CHANGE

 INSTRUCTOR-LED | 4 HOURS

PDS-009: Leading Change

- Understand the three stages of change that people and organizations go through.
- Identify what stage of change people are in by their words or actions.
- Discuss personal reactions to change and rethink the more self-defeating aspects of their reactions to change.
- Identify actions to lead and communicate organizational change through each stage.
- Identify five areas of the organization that leaders can change.

MENTORING

 INSTRUCTOR-LED | 4 HOURS

PDS-010: Mentoring

- Define your role and responsibilities as a mentor or protégé in the mentoring process.
- Understand the phases of mentoring and the activities in each phase.
- Understand your mentor's or protégé's interaction style.
- Set and manage expectations for the mentoring relationship.
- Listen with openness and understanding.
- Provide supportive feedback.
- Coach mistakes without commanding or criticizing.

PARTNERING FOR PERFORMANCE

 INSTRUCTOR-LED | 8 HOURS

PDS-011: Partnering for Performance

- Use a three-phase process to effectively manage performance.
- Assess employee strengths and development opportunities.
- Apply the SMART goal-setting formula.
- Help employees prepare for the goal-setting discussions.
- Apply follow-up techniques to ensure commitments, goals, and standards are being met.
- Apply a structured approach to conducting the performance review.
- Use language that focuses on development versus criticism.
- Establish a safe climate for collaborative performance discussions.
- Apply collaborative techniques to create a two-way dialogue.
- Handle difficult performance discussions.



Contact us to learn more about additional Leadership Development and Employee Engagement curriculum, offered by BlessingWhite, A Division of GP Strategies.

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PRESENTATION SKILLS

 INSTRUCTOR-LED | 8 HOURS

PDS-012: Presentation Skills

- Identify the benefits of a powerful presentation.
- Create an opening that will capture audience attention.
- Apply a five-step process for preparing a powerful presentation.
- Utilize techniques to add variety, interest, and emphasis.
- Manage nervousness.
- Discuss the power of visual, verbal, and vocal skills.
- Use visual aids effectively (handouts, charts, PowerPoint slides).
- Encourage audience participation.
- Manage difficult questions and audience members.

PROVIDE POWERFUL SERVICE

 INSTRUCTOR-LED | 4 HOURS

PDS-013: Provide Powerful Service

- Recognize and understand the perspectives of both internal and external customers and appreciate the impact made on the ability to get their needs met.
- Use a consultative and partner-based approach to facilitate solutions for internal and external customers.
- Apply personal expertise in ways that provide value.
- Provide positive feedback to colleagues on the use of partnership behaviors; ask for and accept feedback from colleagues.

PROBLEM SOLVING AND DECISION MAKING

 INSTRUCTOR-LED | 8 HOURS

PDS-014: Problem Solving and Decision Making

- Define your role in problem solving.
- Identify barriers to effective problem solving.
- Apply a six-step problem-solving process.
- Select appropriate tools to effectively problem solve.

STRESS MANAGEMENT

 INSTRUCTOR-LED | 4 HOURS

PDS-015: Stress Management

- Define stress.
- Discuss how stress works.
- Identify personal sources of stress.
- Apply a three-step process to manage your stress.
- Apply effective strategies to increase resilience.
- Implement an action plan to reduce stress and improve personal productivity.

TEAMWORK

 INSTRUCTOR-LED | 4 HOURS

PDS-016: Teamwork

- Identify telltale signs that the teamwork within your team needs attention.
- Apply techniques to translate goals to individual team members.
- Apply techniques to empower all team members to participate.
- Apply techniques to encourage collaboration among all team members.
- Discuss techniques to track the team's environment and to make adjustments.
- Recognize how teamwork is often more beneficial than individual performance.

TIME MANAGEMENT

 INSTRUCTOR-LED | 4 HOURS

PDS-017: Time Management

- Define time management.
- Develop an effective planning process.
- Identify time wasters and what to do about them.
- Create an action plan for future development.

1 FUNDAMENTALS



INTRODUCTION TO LEAN

 INSTRUCTOR-LED/HANDS-ON  | 2 DAYS

REL-100: Introduction to Lean

- Describe the concept of each of the Lean tools.
- Describe how Lean can improve the performance of an enterprise.
- Understand the rollout process.
- Define the tools supporting the Lean Temple.
- Explain how Lean tools work together to create a Lean environment.
- Recognize areas of improvement within a facility, and identify the correct tool to use.
- Understand how Lean needs to be launched / implemented in an enterprise and why “cherry picking” often fails.

DAILY MANAGEMENT OVERVIEW

 INSTRUCTOR-LED/HANDS-ON  | .5 to 1 DAY



REL-105: Daily Management Overview

- Explain the reason two-thirds of Continuous Improvement initiatives fail.
- Explain how Daily Management and Goal Deployment combine to form Lean Management.
- List and explain the elements of Daily Management.
- Identify ways to apply Daily Management at your organization.
- List and explain the elements of Goal Deployment.

2 APPLIED FUNDAMENTALS



VALUE STREAM MAPPING

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY

REL-200: Value Stream Mapping

- Create a value stream map for both current and future states.
- Collect and collate data.
- Devise an action plan.
- Set measurables and objectives.
- Devise spaghetti diagrams.

BLUE SKY AND MASTER SCHEDULE

 INSTRUCTOR-LED/HANDS-ON  | 3 DAYS

REL-205: Blue Sky and Master Schedule

- Understand the prerequisites for Blue Sky.
- Create a Blue Sky common measurable vision.
- Create a Master Schedule.
- Align divisions and departments to Blue Sky.
- Measure and monitor the implementation of Blue Sky.

SIX SIGMA GREEN BELT

 INSTRUCTOR-LED/HANDS-ON  | TWO 4.5 DAY BLOCKS

REL-210: Six Sigma Green Belt

- Explain how Six Sigma improves business performance.
- Describe the Six Sigma approach.
- Describe sources of variability and process sigma level.
- Describe the DMAIC improvement methodology, and use it to perform Green Belt-level projects.
- Use Six Sigma tools, including Voice of Customer, $Y=f(x)$, basic QC tools, process mapping, measurement systems analysis, use of statistics, sampling, confidence intervals, ANOVA, process capability, graphical analysis, correlation and regression, cost-benefit analysis, error proofing, and standards.
- Use project plans and issues lists to manage Six Sigma projects.
- Report on project progress during toll gate reviews.



SIX SIGMA BLACK BELT UPGRADE

 INSTRUCTOR-LED/HANDS-ON  | TWO 4.5 DAY BLOCKS

REL-215: Six Sigma Black Belt Upgrade

- Be an articulate proponent of how Six Sigma improves business performance.
- Perform Green- Belt and Black Belt-level projects.
- Use advanced Six Sigma tools, including customer surveys, QFD, DOE, analysis of paired and two-sided t-tests, non-normal data, multiple regression, and advanced control charts.
- Use project plans, work breakdown structure, project reviews, and issues lists to manage Six Sigma projects crossing multiple departments.
- Facilitate project teams.
- Coach process owners after project hand-off.

STANDARD WORK PROCESS: THE FOUNDATION TO IMPROVE

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY


REL-220: Standard Work Process: The Foundation to Improve

- Describe the Standard Work Process.
- Identify critical processes in order to focus resources.
- Identify different types of standards and where and when to use each.
- Create a sample standard.
- Conduct training on a standard.
- Use a standard audit practice to assess understanding and identify opportunities for improvement.
- Address failures.

2 APPLIED FUNDAMENTALS



PROCESS PROBLEM SOLVING

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY

REL-225: Process Problem Solving

- Understand different levels of problem solving.
- Define the Process Problem Solving methodology.
- Apply, in a practical environment, the Process Problem Solving methodology.
- State the reasons and benefits for implementing Process Problem Solving.
- Identify barriers to implementing Process Problem Solving and develop ways to remove them.



QUICK CHANGEOVER

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY

REL-230: Quick Changeover

- Define Quick Changeover.
- Describe the steps to reducing changeover time.
- Identify and implement improvements in changeover activity.
- Determine how changeover time impacts key operating system principles.
- Understand the importance of teamwork.
- Understand parallel processing.
- Identify the seven wastes.
- Recognize the benefits gained from reduced changeover time.

KANBAN

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY

REL-235: Kanban

- Describe how Kanban supports JIT in a Lean system.
- Explain how a Kanban system works.
- Identify the different types of Kanban and flows for each.
- Describe five rules and four types of Kanban.
- List the preconditions required for Kanban implementation.
- Describe how Kanban controls production and material flow.
- Identify the factors to consider when calculating Kanban.

OPERATOR ASSET CARE (OAC) WORKSHOP

 INSTRUCTOR-LED/HANDS-ON  | 2-4 DAYS

REL-240: Operator Asset Care (OAC) Workshop

- Identify the benefits of improving equipment cleanliness and reliability.
- Define the term "abnormality" as it applies to your equipment.
- Describe the effects that equipment abnormalities have on safety, production capability, and product quality.
- Describe the P-F curve and where abnormalities fit on the curve.
- List common abnormalities and the use of 5 Senses to identify them.
- Describe the roles and responsibilities of the various personnel who participate in the OAC program.
- Develop and use a standard OAC inspection form.
- Fill out an abnormality tag and register it properly at the OAC board.
- Describe the types of information available on the OAC board.
- Apply visual controls to the equipment in assigned work areas.
- Describe the purpose of and use a one point lesson.
- Explain the concept of continuous improvement as it applies to the OAC process.
- Read, evaluate, and apply the standard OAC audit form.
- Monitor the progress of an OAC area through key performance indicators and audit forms.



PROCESS FAILURE MODE EFFECTS ANALYSIS (PFMEA) AND PROCESS CONTROL

 INSTRUCTOR-LED/HANDS-ON  | 5 DAYS

REL-245: Process Failure Mode Effects Analysis (PFMEA) and Process Control

- Analyze a process to identify and prioritize failure modes.
- Identify and implement corrective and preventive actions for failure modes.
- Identify opportunities for error-proofing.
- Design and implement an effective process measurement system.
- Establish methods to control process performance.
- Address failures and solve problems to improve process performance.

MAINTENANCE PLANNING AND SCHEDULING – COMPREHENSIVE

 INSTRUCTOR-LED/HANDS-ON  | 4 DAYS

REL-250: Maintenance Planning and Scheduling – Comprehensive

- Describe the role of planning and scheduling in asset management.
- Understand the concepts of maintenance waste and its effect on wrench time.
- Discuss work management techniques and their overall impact to the asset management strategy.
- Explain the work management cycle and the specific application of each phase of the cycle to include:
 - Work identification
 - Work control
 - Planning
 - Scheduling
 - Work execution
 - Failure Reporting and Corrective Action System (FRACAS)
- Understand the importance of clearly defining roles and responsibilities within the organization.
- Explain the need for standardized planning and scheduling meetings.
- Develop and apply a system for prioritizing work.
- Understand how to calculate the work backlog.

- List the minimum acceptable elements of a good job plan.
- Understand the value and difference between subjective and quantitative task descriptions.
- Develop effective work procedures within the good job plan.
- Describe and apply the necessary elements to support a weekly scheduling process.
- Apply the special techniques required to plan for and execute effective outages.
- Measure the performance of specific elements of the work execution management process.

MAINTENANCE PLANNING AND SCHEDULING – FOR MANAGERS

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY or 2 DAYS
2 Day includes Game

REL-255: Maintenance Planning and Scheduling – For Managers

- 2 Day training option includes Planning & Scheduling Game.
- Discuss management's role in planning and scheduling.
- Describe the elements of planning and scheduling.
- Define compelling reasons for improving planning and scheduling.
- Understand the path to world-class maintenance.
- Explain the need for standardized planning and scheduling meetings.
- Describe the concepts of hidden capacity.
- Understand the value of planned work.
- Determine the value of maintenance effort.
- Understand the anatomy of a planned job vs. an unplanned job.
- Understand the maintenance planner's role.
- Describe planning and scheduling's role in improving reliability and operational excellence.
- Determine how to measure success and explain KPIs.

2 APPLIED FUNDAMENTALS



MAINTENANCE PLANNING AND SCHEDULING – DAILY MAINTENANCE

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY or 2 DAYS
2 Day includes Game

REL-260: Maintenance Planning and Scheduling – Daily Maintenance

- 2 Day training option includes Planning & Scheduling Game.
- Define the maintenance technician's role in the planning and scheduling cycle.
- Explain the need for standardized planning and scheduling meetings.
- Understand the importance of effective work procedures.
- Describe how early work identification improves planning and scheduling.
- Explain the sources of maintenance wastes and their impact on planning and scheduling.
- Discuss best-in-class wrench time models and how to improve wrench time.
- Understand work priorities and the importance of recording the correct work codes in the CMMS.
- Understand the difference between reactive and proactive work.
- Discuss work execution and feedback.

MAINTENANCE PLANNING AND SCHEDULING – DOWNDAYS AND OUTAGES

 INSTRUCTOR-LED/HANDS-ON  | 1 DAY or 2 DAYS
2 Day includes Game

REL-265: Maintenance Planning and Scheduling – Downtimes and Outages

- 2 Day training option includes OUTAGE! Game.
- Understand the difference between outage work and routine work.
- Describe planning requirements for outage work.
- Describe scheduling requirements for outage work.
- Explain the need for standardizing requirements for outage work.
- Determine what makes an outage successful; overcome the challenges.
- Understand effective shutdown management and improvement techniques.
- Describe how to apply critical path management for outage duration.
- Explain how to perform risk assessments for outages.
- Explain the need for an outage war room; communicate obsessively.
- Measure outage success; explain KPIs.

ROOT CAUSE FAILURE ANALYSIS (RCFA)

 INSTRUCTOR-LED/HANDS-ON  | 2 DAYS

REL-270: Root Cause Failure Analysis (RCFA)

- Discuss the nature of problems and understand the difference between common problems and special problems.
- Describe the SDCA/PDCA cycle and how it applies to the process of eliminating problems.
- Describe the Five Whys technique for root cause determination.
- Explain the use of a cause and effect (fishbone) diagram in the determination of a root cause.
- Describe the Situation Target Proposal methodology for problem resolution.
- Describe the Quality Improvement Story methodology for problem resolution.
- Implement a RCFA management system.



STREAMLINED RELIABILITY CENTERED MAINTENANCE (SRCM)

 INSTRUCTOR-LED/HANDS-ON  | 4 DAYS

REL-275: Streamlined Reliability Centered Maintenance (SRCM)

- Define the purpose of SRCM.
- Understand SRCM vs RCM.
- Describe SRCM benefits.
- Understand FMEA and its role in SRCM.
- Plan and conduct an FMEA.
- Understand the Mean Time Between Failure (MTBF).
- Review classical failure modes.
- Understand the P-F Curve.
- Describe the select maintenance strategies.
- Establish SRCM teams.
- List the seven essentials of SRCM.
- Define the SRCM process.
- Plan and conduct FMEAs.
- Describe FMEA action plans and their implementation.
- Understand Preventive Maintenance Optimization.
- Measure success throughout the SRCM process.

CENTER LINING FUNDAMENTALS

 INSTRUCTOR-LED/HANDS-ON  | 2 DAYS

REL-280: Center Lining Fundamentals

- Describe the center lining methodology.
- Identify and document product transformations in detail.
- Develop documentation to support center lining.
- Implement a sustainable center lining process that will keep the equipment operating to center lines.

2 APPLIED FUNDAMENTALS



BLOODBORNE PATHOGEN TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 2 HOURS

SAF-200: Bloodborne Pathogen Training

- Describe incident and exposure protocols, as well as post-exposure medical follow-up procedures.
- Understand work practices geared to reduce exposure risks.
- Understand engineering controls and how they are used and maintained.
- Know the purpose of personal protective equipment (PPE), where it is kept, and when it must be used and how.
- Describe procedures for handling and disposing of wastes.
- Describe procedures for handling contaminated laundry and personal clothing.

 ONLINE | GPiLEARN+ COURSES

ND-BBP-1.0: Bloodborne Pathogens Awareness (SafetySkills)

OS0601: Bloodborne Pathogens Awareness

CONFINED SPACE ENTRY (ENTRANT, ATTENDANT, SUPERVISOR) TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-205: Confined Space Entry (Entrant, Attendant, Supervisor) Training

- Know the hazards that may be encountered during entry and the signs, symptoms, and consequences of exposure.
- Know about the equipment necessary for safe confined space entry.
- Understand communication procedures and the importance of exiting the space when conditions warrant or an alarm sounds.
- Understand the entry permit and the information that must be listed or added as needed.
- Know about self-rescue and attendant rescue techniques.
- Understand the basis and basics of OSHA standard 29 CFR 1910.146.

 ONLINE | GPiLEARN+ COURSES

ND-CFS-1.0: Confined Space Awareness (SafetySkills)

OS0701: Confined Space Module 1

CONFINED SPACE RESCUE TECHNICIAN TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

SAF-210: Confined Space Rescue Technician Training

- Understand the construction, usages, and limitations of various types of hardware and software such as ropes, webbing, carabiners and pulleys.
- Demonstrate proficiency in tying and utilizing knots as appropriate.
- Demonstrate proficiency in configuring acceptable anchor points.
- Understand the dynamics of critical angles and forces involved.
- Demonstrate proficiency in constructing lowering systems.
- Demonstrate proficiency in constructing mechanical advantage systems for hauling, raising, and moving loads.
- Demonstrate proficiency in patient packaging and handling techniques.
- Be able to use and establish common communication procedures, team roles, and responsibilities, including an incident command system.
- Display teamwork developed during group scenarios.

 ONLINE | GPiLEARN+ COURSES

ND-CFS-1.0: Confined Space Awareness (SafetySkills)

OS0702: Confined Space Module 2



CONFINED SPACE RESCUE REFRESHER TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-215: Confined Space Rescue Refresher Training

- Understand the construction, usages, and limitations of various types of hardware and software such as ropes, webbing, carabiners, and pulleys.
- Demonstrate proficiency in tying and utilizing knots as appropriate.
- Demonstrate proficiency in configuring acceptable anchor points.
- Understand the dynamics of critical angles and forces involved.
- Demonstrate proficiency in constructing lowering systems.
- Demonstrate proficiency in constructing mechanical advantage systems for hauling, raising, and moving loads.
- Demonstrate proficiency in patient packaging and handling techniques.
- Be able to use and establish common communication procedures, team roles, and responsibilities, including an incident command system.
- Display teamwork developed during group scenarios.

 ONLINE | GPiLEARN+ COURSES

ND-CFS-1.0: Confined Space Awareness (SafetySkills)

OS0703: Confined Space Module 3

FIRST AID/CPR/AED TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 7 HOURS

SAF-220: First Aid/CPR/AED Training

- Understand how to use the EMS system.
- Describe how to identify and care for breathing emergencies.
- Describe how to identify and care for heart attack and cardiac arrest in adults.
- Describe how to reduce the risk of heart attack.
- Describe how to identify and care for life-threatening bleeding.
- Identify how to provide care for different sudden illnesses and injuries.
- Identify how to provide care for different types of wounds.
- Describe how to splint dislocations, strains, sprains, and fractures.

 ONLINE | GPiLEARN+ COURSES

ND-BFA-1.0: Basic First Aid (SafetySkills)

OS0301: AED

OS0401: Basic CPR

OS0501: Basic First Aid

FALL PROTECTION AWARENESS TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

SAF-225: Fall Protection Awareness Training

- Have an introduction to working at heights.
- Understand the OSHA Regulations Concerning Working at Heights.
- Describe hazards of working at heights.
- Describe ladder safety.
- Introduce roof, scaffold, and work platform safety.
- Explain fall protection systems.
- Explain fall protection equipment and proper use.

 ONLINE | GPiLEARN+ COURSES

ND-FAL-1.0: Fall Protection (SafetySkills)

OS1101: Fall Protection

2 APPLIED FUNDAMENTALS



FIRE EXTINGUISHER TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

SAF-235: Fire Extinguisher Training

- Demonstrate the appropriate use of equipment to employees who have been designated to use firefighting equipment as part of the company's emergency action plan.

 ONLINE | GPiLEARN+ COURSES

OS1801: Portable Fire Extinguishers

FIREFIGHTER SURVIVAL/MAYDAY TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 10 HOURS

SAF-240: Firefighter Survival/Mayday Training

- Understand that the second leading cause of firefighter line-of-duty fatalities is becoming lost, caught, or trapped on the fireground.
- Illustrate how the disorientation sequence plays a role in firefighter fatalities.
- Illustrate the importance of fireground accountability.
- Understand the Mayday Protocol and the parameters for declaring a Mayday.
- Understand basic survival awareness by discussing fire dynamics, building types, the warning signs of collapse, and the types of collapse.
- Understand sound search and rescue techniques.
- Understand size-up and search techniques for rapid intervention.
- Understand tactical considerations when switching from suppression strategy to a high-priority rescue.
- Understand the importance of a strong command presence and managing resources when a Mayday is called.
- Discuss considerations for developing standard operating procedures.

 ONLINE | GPiLEARN+ COURSES

ND-FRS-1.0: Fire Safety (SafetySkills)

HAZARD COMMUNICATION TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

SAF-245: Hazard Communication Training

- Know the hazardous chemicals that workers are exposed to, by means of a hazard communication program, labels, and other forms of warning, SDS, and information and training.
- Know the operations in the work area where hazardous chemicals are present.
- Know the location and availability of the written hazard communication.
- Understand the Global Harmonizing System (GHS).

 ONLINE | GPiLEARN+ COURSES

ND-HZC-1.0: Hazard Communication (SafetySkills)

OS1301: Hazard Communication

HAZARDOUS CHEMICAL TRANSPORTATION (Formerly DOT HM-126F) TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

SAF-250: Hazardous Chemical Transportation (Formerly DOT HM-126F) Training

- Understand the principles of HM-172.704.
- Explain the hazardous materials table.
- Explain shipping papers.
- Explain labeling of hazardous materials.
- Demonstrate packaging and marking.
- Demonstrate loading and segregating materials.
- Explain placard requirements.
- Introduce safety training overview.
- Explain DOT Emergency Response Guide.
- Explain the properties of hazardous material.
- Explain DOT classifications of hazardous materials.
- Demonstrate basic emergency response actions.

 ONLINE | GPiLEARN+ COURSES

ND-HMT-0.0: Hazardous Materials Transportation, Introduction (SafetySkills)



HAZWOPER/HAZMAT AWARENESS TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 to 8 HOURS

SAF-255: HAZWOPER/HAZMAT Awareness Training

- Understand what hazardous substances are, and their associated risks in an incident.
- Know the potential outcomes associated with an emergency created when hazardous substances are present.
- Have the ability to recognize the presence of hazardous substances in an emergency.
- Understand the role that the first responder plays in the employer's emergency response plan, including site security and control, and the U.S. Department of Transportation's Emergency Response Guidebook.
- Have the ability to identify the hazardous substances, if possible.
- Have the ability to realize the need for additional resources, and to make the appropriate notification to the communication center.

 ONLINE | GPiLEARN+ COURSES

ND-HZM-1.0: Hazardous Materials Management, Basic (SafetySkills)

OS1401: HAZMAT Module 1

HAZWOPER/HAZMAT OPERATIONS TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 24 HOURS

SAF-256: HAZWOPER/HAZMAT Operations Training

- Know basic hazard and risk assessment techniques.
- Know how to select and use proper personal protective equipment provided to the first responder at the operations level.
- Understand basic hazardous material terms.
- Know how to perform basic control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.
- Know how to implement basic decontamination procedures.
- Understand the relevant standard operating procedures and termination procedures.

 ONLINE | GPiLEARN+ COURSES

ND-HZW-1.0: Hazardous Waste Awareness (SafetySkills)

OS1402: HAZMAT Module 2

HAZWOPER/HAZMAT TECHNICIAN TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

SAF-257: HAZWOPER/HAZMAT Technician Training

- Safety Training Services, Inc. offers a comprehensive training program that encompasses all aspects of hazardous waste operations for technicians.

 ONLINE | GPiLEARN+ COURSES

ND-HZW-1.0: Hazardous Waste Awareness (SafetySkills)

HAZWOPER/HAZMAT TECHNICIAN REFRESHER TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-258: HAZWOPER/HAZMAT Technician Refresher Training

- Safety Training Services, Inc. offers a refresher course in hazardous waste operations and emergency response for technicians.

2 APPLIED FUNDAMENTALS



MANAGEMENT & SUPERVISOR HAZMAT TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-260: Management & Supervisor HAZMAT Training

- Have the ability to coordinate a site-specific health and safety program.
- Have the ability to design a site-specific safety and health plan.
- Define employee training programs and requirements.
- Have the ability to coordinate a PPE program.
- Have the ability to coordinate a spill containment program.
- Define health hazard procedures and recovery techniques.

NFPA 70E ARC FLASH TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-265: NFPA 70E Arc Flash Training

- Identify electrical hazards in the workplace.
- Determine the personal protective equipment required based on the task to be performed.
- Identify safer alternatives to existing procedures.
- Establish an electrically safe work environment.

 ONLINE | GPiLEARN+ COURSES

ND-ELT-1.0: Electrical Safety (SafetySkills)

ND-ELT-2.0: Electrical Safety - Grounding (SafetySkills)

ND-ELT-3.0: Electrical Safety Above 601 Volts (SafetySkills)

ND-ELT-4.0: Electrical Safety - Arc Flash (SafetySkills)

OS0901: Electrical Safety

OS2501: Arc Flash Awareness

OCCUPATIONAL NOISE EXPOSURE TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 2 HOURS

SAF-270: Occupational Noise Exposure Training

- Recognize applicable hazardous noise sources, the type and magnitude of noise reduction devices available in the workplace, and the methods and means necessary to protect an employee's hearing.
- Understand the purpose and use of noise and hearing conservation equipment.

 ONLINE | GPiLEARN+ COURSES

ND-HRC-1.0: Hearing Conservation (SafetySkills)

OS1501: Hearing Conservation Module 1

OS1502: Hearing Conservation Module 2

ON-SCENE INCIDENT COMMANDER

 INSTRUCTOR-LED/HANDS-ON  | 8 HOURS

SAF-275: On-Scene Incident Commander

- Know how to implement the employer's incident command system.
- Know how to implement the employer's emergency response plan.
- Know and understand the hazards and risks experienced by employees working in chemical protective clothing.
- Know how to implement the local emergency response plan.
- Be familiar with the state emergency response plan and the federal Regional Response Team.
- Know and understand the importance of decontamination procedures.

 ONLINE | GPiLEARN+ COURSES

ND-INV-1.0: Incident Investigation (SafetySkills)



OSHA 10-HOUR GENERAL INDUSTRY TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 10 HOURS

SAF-280: OSHA 10-Hour General Industry Training

- Have an introduction to OSHA.
- Identify hazards related to walking and working surfaces.
- Know and understand the importance of exit routes, emergency action plans, fire prevention, and protection plans.
- Understand electrical hazards.
- Have an understanding of PPE and when it is required.
- Understand hazard communication.

 ONLINE | GPiLEARN+ COURSES

- ND-ELT-1.0: Electrical Safety (SafetySkills)
- ND-ELT-2.0: Electrical Safety - Grounding (SafetySkills)
- ND-ELT-3.0: Electrical Safety Above 601 Volts (SafetySkills)
- ND-ELT-4.0: Electrical Safety - Arc Flash (SafetySkills)
- ND-INO-1.0: Introduction to OSHA (SafetySkills)
- ND-FRS-1.0: Fire Safety (SafetySkills)
- ND-FRS-2.0: Portable Fire Extinguishers (SafetySkills)
- ND-GHS-1.0: Globally Harmonized System (SafetySkills)
- ND-HZC-1.0: Hazard Communication (SafetySkills)
- ND-HRC-1.0: Hearing Conservation (SafetySkills)
- ND-OSH-1.0: Occupational Safety and Health Programs (SafetySkills)
- ND-MSD-1.0: Material Safety Data Sheets (SafetySkills)
- ND-PPE-1.0: Personal Protective Equipment (SafetySkills)
- ND-RSP-1.0: Respiratory Protection (SafetySkills)
- ND-STF-1.0: Slips, Trips, and Falls (SafetySkills)
- OS0901: Electrical Safety
- OS1301: Hazard Communication
- OS1302: GHS Hazard Communication
- OS1501: Hearing Conservation - Module 1
- OS1502: Hearing Conservation - Module 2
- OS1801: Portable Fire Extinguishers
- OS1901: PPE General Protection
- OS1902: PPE Foot Protection

OS1903: PPE Eye and Face Protection

OS1904: PPE Hand Protection

OS1905: PPE Head Protection

OS2001: Respirators - Module 1

OS2002: Respirators - Module 2

OS2003: Respirators - Module 3

OS2501: Arc Flash Awareness

OSHA 30-HOUR GENERAL INDUSTRY TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 30 HOURS

SAF-281: OSHA 30-Hour General Industry Training

- Have an introduction to OSHA.
- Identify hazards related to walking and working surfaces.
- Know and understand the importance of exit routes, emergency action plans, fire prevention, and protection plans.
- Understand electrical hazards.
- Have an understanding of PPE and when it is required.
- Understand hazard communication.
- Understand materials handling.

 ONLINE | GPiLEARN+ COURSES

- ND-ELT-1.0: Electrical Safety (SafetySkills)
- ND-ELT-2.0: Electrical Safety - Grounding (SafetySkills)
- ND-ELT-3.0: Electrical Safety Above 601 Volts (SafetySkills)
- ND-ELT-4.0: Electrical Safety - Arc Flash (SafetySkills)
- ND-ERG-1.0: Industrial Ergonomics (SafetySkills)
- ND-FRS-1.0: Fire Safety (SafetySkills)
- ND-FRS-2.0: Portable Fire Extinguishers (SafetySkills)
- ND-GHS-1.0: Globally Harmonized System (SafetySkills)
- ND-HRC-1.0: Hearing Conservation (SafetySkills)
- ND-HZC-1.0: Hazard Communication (SafetySkills)
- ND-INO-1.0: Introduction to OSHA (SafetySkills)

2 APPLIED FUNDAMENTALS



OSHA 30-HOUR GENERAL INDUSTRY TRAINING

CONTINUED

 ONLINE | GPiLEARN+ COURSES continued

- ND-JSA-2.0: Back Injury Prevention (SafetySkills)
- ND-MAT-1.0: Material Handling (SafetySkills)
- ND-MSD-1.0: Material Safety Data Sheets (SafetySkills)
- ND-OSH-1.0: Occupational Safety and Health Programs (SafetySkills)
- ND-PPE-1.0: Personal Protective Equipment (SafetySkills)
- ND-RSP-1.0: Respiratory Protection (SafetySkills)
- ND-STF-1.0: Slips, Trips, and Falls (SafetySkills)
- ND-WHS-1.0: Warehouse Safety (SafetySkills)
- OS0901: Electrical Safety
- OS1001: Ergonomics
- OS1002: Industrial Ergonomics
- OS1301: Hazard Communication
- OS1302: GHS Hazard Communication
- OS1501: Hearing Conservation - Module 1
- OS1502: Hearing Conservation - Module 2
- OS1801: Portable Fire Extinguishers
- OS1901: PPE General Protection
- OS1902: PPE Foot Protection
- OS1903: PPE Eye and Face Protection
- OS1904: PPE Hand Protection
- OS1905: PPE Head Protection
- OS2001: Respirators - Module 1
- OS2002: Respirators - Module 2
- OS2003: Respirators - Module 3
- OS2501: Arc Flash Awareness

OSHA 10-HOUR CONSTRUCTION INDUSTRY TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 10 HOURS

SAF-282: OSHA 10-Hour Construction Industry Training

- Have an introduction to OSHA.
- Know the Focus Four Hazards, including fall protection, electrical, struck by, and caught in/between.
- Have an understanding of PPE and LSE and when it is required.
- Know the health hazards in construction, including hazard communication and silica.

 ONLINE | GPiLEARN+ COURSES

- ND-ASB-1.0: Asbestos Hazard Awareness (SafetySkills)
- ND-BCS-1.0: Construction Safety (SafetySkills)
- ND-BCS-2.0: Struck By and Caught Between Injuries for Construction (SafetySkills)
- ND-CHM-2.0: Carcinogen Awareness (SafetySkills)
- ND-ELT-1.0: Electrical Safety (SafetySkills)
- ND-EXC-1.0: Excavation and Trenching (SafetySkills)
- ND-FAL-1.0: Fall Protection (SafetySkills)
- ND-GHS-1.0: Globally Harmonized System (SafetySkills)
- ND-HRC-1.0: Hearing Conservation (SafetySkills)
- ND-HZC-1.0: Hazard Communication (SafetySkills)
- ND-INO-1.0: Introduction to OSHA (SafetySkills)
- ND-MSD-1.0: Material Safety Data Sheets (SafetySkills)
- ND-OGS-52.0: Silica (SafetySkills)
- ND-OSH-1.0: Occupational Safety and Health Programs (SafetySkills)
- ND-PPE-1.0: Personal Protective Equipment (SafetySkills)
- ND-RSP-1.0: Respiratory Protection (SafetySkills)
- OS0901: Electrical Safety
- OS1101: Fall Protection
- OS1301: Hazard Communication
- OS1302: GHS Hazard Communication
- OS1501: Hearing Conservation - Module 1
- OS1502: Hearing Conservation - Module 2
- OS1901: PPE General Protection



- OS1902: PPE Foot Protection
- OS1903: PPE Eye and Face Protection
- OS1904: PPE Hand Protection
- OS1905: PPE Head Protection
- OS2001: Respirators - Module 1
- OS2002: Respirators - Module 2
- OS2003: Respirators - Module 3

PERSONAL PROTECTIVE EQUIPMENT (PPE) TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 2 HOURS

SAF-285: Personal Protective Equipment (PPE) Training

- Determine when personal protective equipment is necessary.
- Determine what personal protective equipment is necessary.
- Know the limitations of personal protective equipment.
- Know how to properly don, doff, adjust, and wear personal protective equipment.
- Know the proper care, maintenance, useful life and disposal of the personal protective equipment.

 ONLINE | GPiLEARN+ COURSES

- ND-HRC-1.0: Hearing Conservation (SafetySkills)
- ND-PPE-1.0: Personal Protective Equipment (SafetySkills)
- ND-RSP-1.0: Respiratory Protection (SafetySkills)
- OS1501: Hearing Conservation - Module 1
- OS1502: Hearing Conservation - Module 2
- OS1901: PPE General Protection
- OS1902: PPE Foot Protection
- OS1903: PPE Eye and Face Protection
- OS1904: PPE Hand Protection
- OS1905: PPE Head Protection
- OS2001: Respirators - Module 1
- OS2002: Respirators - Module 2
- OS2003: Respirators - Module 3

RESPIRATORY PROTECTION TRAINING

 INSTRUCTOR-LED/HANDS-ON  | 4 HOURS

SAF-290: Respiratory Protection Training

- Safety Training Services, Inc. will provide training according to the Respiratory Protection Standard (29 CFR 1910.134).

 ONLINE | GPiLEARN+ COURSES

- ND-RSP-1.0: Respiratory Protection (SafetySkills)
- OS2001: Respirators - Module 1
- OS2002: Respirators - Module 2
- OS2003: Respirators - Module 3

2 APPLIED FUNDAMENTALS



OXYGEN/ACETYLENE (OXY/ACT) CUTTING

 INSTRUCTOR-LED/HANDS-ON  | 40 HOURS

WE-200: Oxygen/Acetylene (OXY/ACT) Cutting

- Describe equipment and gases used in oxy-acetylene cutting.
- Identify oxy-fuel equipment and its uses.
- Discuss the hose and hose fittings used in oxy-acetylene cutting.
- Identify safety and health hazards in oxy-fuel applications.
- Identify and describe the safety equipment associated with oxy-acetylene cutting.
- Demonstrate proper setup for safe operation of oxy-acetylene equipment.
- Operate an oxy-acetylene torch and perform manual flame cutting.

 ONLINE | GPiLEARN+ COURSES

- MM2101: How Cutting Tip Size Is Selected to Obtain a Neutral Flame
- MM2102: Proper Setup for Oxy-Acetylene Cutting Equipment
- MM2103: Safe Usage of Oxy-Acetylene Cutting Equipment
- MM2104: Oxy-Acetylene Cutting
- MM2105: Proper Flame Settings in Relation to Welding Tip Size and Material Thickness
- MM2106: Setting Proper Oxy-Acetylene Flame for Fusion Welding
- MM2107: Matching Proper Filler Metals to Base Metals
- MM2108: Matching of Filler Metal Requirements to Base Metals for Fusion Welding
- MM2109: Oxy-Acetylene Fusion Welding on Carbon Steel
- MM2110: Flame Setting for Oxy-Acetylene Brazing for Various Silver Alloy Fillers
- MM2111: Reducing/Carburizing of the Flame for Brazing Various Metal Alloys
- MM2112: Matching of Proper Filler Metals to Base Metals to Achieve Strength and Integrity

- MM2113: Matching of Filler Metals for Brazing to Various Types of Base Metals
- MM2114: Oxy-Acetylene Brazing on Various Metal Alloys
- MM2115: Proper Flame Setting for Braze Welding Various Thickness of Carbon Steel and Cast Irons
- MM2116: Braze Welding Various Joint Configurations
- MM2117: Proper Braze Welding of Various Bead Configurations
- MM2118: Braze Welding on Various Base Metal Types
- MM2119: Matching of Braze Welding Filler Metals With Various Base Metals
- MM2120: Oxy-Acetylene Braze Welding on Carbon Steel and Cast Iron Base Metals



SHIELDED METAL ARC WELDING (SMAW)

 INSTRUCTOR-LED/HANDS-ON  | 200 HOURS

WE-205: Shielded Metal Arc Welding (SMAW)

- Discuss SMAW and its applications.
- Identify and discuss proper SMAW welding procedures.
- Prepare and assemble a pipe joint without backing.
- Discuss criteria to identify the quality of a weld.
- Demonstrate proper application of a root pass.
- Demonstrate proper application of hot pass and stringers.
- Demonstrate the correct use of preheat and interpass temperatures.
- Prepare and assemble a pipe joint with a backing rig.

 ONLINE | GPiLEARN+ COURSES

- MM2121: Shielded Metal Arc Welding on Carbon Steel Plate to AWS-BU-2A Prequalified Joint Weld Procedures
- MM2122: Shielded Metal Arc Welding on Carbon Steel Pipe
- MM2123: Shielded Metal Arc Welding on Carbon Steel Pipe With Gas Tungsten Arc Welding Root
- MM2124: SMAW on Carbon Steel Tube, Gas Tungsten Arc Welding for Root with Carbon Steel Filler
- MM2125: Gas Tungsten Arc Welding on Carbon Steel Tube with Stainless Steel Filler
- MM2126: Electric Arc Welding Process for Welding in Various Positions
- MM2127: Electric Arc Welding Filler Metal Selection Based on Positions
- MM2128: Matching of Electric Arc Welding Filler Metals to Their Application Positions

PIPE WELDING

 INSTRUCTOR-LED/HANDS-ON  | 200 HOURS

WE-210: Pipe Welding

- Discuss uphill shielded metal arc welding and its applications.
- Identify and discuss proper pipe welding procedures.

 ONLINE | GPiLEARN+ COURSES

- MM2129: Selection of Electric Arc Filler Metals Based on Application and Positions
- MM2130: Welding Positions and Their Orientations
- MM2131: Usage of Polarities DC and Current Flow in Electric Arc Welding With Covered Electrodes
- MM2132: Setup of Electric Arc Welding Equipment for SMA Welding in Both Polarities on Steel Plate
- MM2133: Welding Positions and Their Orientations for Pipe Welding
- MM2134: Setup of Pipe Coupons for SMAW in the 2G, 5G, and 6G Fixed Pipe Positions
- MM2135: Fit-Up Procedures for Chill Rings on Selected Size Pipes
- MM2136: Fit-Up Procedures for Chill Rings on Various Pipe Sizes
- MM2137: Differences Between Mild Carbon Steel Filler Metals and Stainless Steel Filler Metals
- MM2138: Differences in Weldability Between Carbon Steel and Stainless Steel
- MM2139: Setup of GTAW Equipment for Straight Polarity Welding With Argon Shielding Gas
- MM2140: Setup of GTAW Equipment for Straight Polarity Welding With Argon Shielding Gas
- MM2141: Joint Fit-Up Procedure for Welding Proper Size GTAW Root Pass on Pipe
- MM2142: Proper Joint Fit-Up Procedure for Welding GTAW Root Pass on Pipe
- MM2143: Argon Backing Gas Purge Systems for Root Protection Against "Sugaring" Pipe
- MM2144: Electric Arc Welding Process for Welding in the Flat Position
- MM2145: Electric Arc Welding Filler Metal Selection Based on the Flat Position
- MM2146: Matching of Electric Arc Welding Filler Metal Application to the Flat Position



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