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.
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
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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.
- Calculate equivalent resistance of series and parallel resistive circuits.
- 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

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

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

EL0703: Alternating Current (AC) Generators
IE0201: Alternating Current (AC) Theory
PF1502: Alternating Current (AC) Electricity and Generators
**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.
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  |  GPlEARN+ 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  |  GPlEARN+ 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  |  GPlEARN+ 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
**SITE SPECIFIC 3**

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**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

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**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.

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**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.

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**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

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**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.
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
**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
- **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.

ONLINE | GPILEARN+ COURSES
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.
**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
AC02: Characteristics of Control Instruments
AC03: Controller and Control Action

**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

**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
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
# 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
**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
**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

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**RECI PROCATING 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
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.
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
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**

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.
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

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
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

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
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

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)
CC24SA: Combustion Turbine Support Systems (Siemens 501F) (Part 1)

CC24SB: Combustion Turbine Support Systems (Siemens 501F) (Part 2)

CC25GA: Gas Turbine Operations and Maintenance Considerations (GE Frame 7F) (Part 1)

CC25GB: Gas Turbine Operations and Maintenance Considerations (GE Frame 7F) (Part 2)

CC25SA: Combustion Turbine Operations and Maintenance Considerations (Siemens 501F) (Part 1)

CC25SB: Combustion Turbine Operations and Maintenance Considerations (Siemens 501F) (Part 2)

CC26G: Gas Turbine Performance and Reliability (GE Frame 7F)

CC26S: Combustion Turbine Performance and Reliability (Siemens 501F)

CC27S: TXP Control System (Siemens 501F)

CT0101: Introduction to Gas Turbines (GE Frame 9FA)

CT0102: Gas Turbine Main Components (GE Frame 9FA) (Part 1)

CT0103: Gas Turbine Main Components (GE Frame 9FA) (Part 2)

CT0104: Gas Turbine Generator (GE Frame 9FA)

CT0105: Gas Turbine Support Systems (GE Frame 9FA) (Part 1)

CT0106: Gas Turbine Support Systems (GE Frame 9FA) (Part 2)

CT0107: Gas Turbine Operations and Maintenance Considerations (GE Frame 9FA) (Part 1)

CT0108: Gas Turbine Operations and Maintenance Considerations (GE Frame 9FA) (Part 2)

CT0109: Gas Turbine Performance and Reliability (GE Frame 9FA)

CT0201: Introduction to Combustion Turbines (SGT5-4000F/V94.3)

CT0202: Combustion Turbine Generator Starting and Air System (SGT5-4000F/V94.3)

CT0203: Lube, Shaft, and Control Oil System and the Turning Gear (SGT5-2000E/V94.2)

CT0204: Fuel Systems (SGT5-4000F/V94.3)

CT0205: Combustion Turbine Control (SGT5-4000F/V94.3)

CT0301: Introduction to Combustion Turbines (SGT5-2000E/V94.2)

CT0302: Combustion Turbine Generator Starting and Air Systems (SGT5-2000E/V94.2)

CT0303: Lube, Shaft, and Control Oil System and the Turning Gear (SGT5-2000E/V94.2)

CT0304: Fuel Systems (SGT5-2000E/V94.2)

CT0305: Combustion Turbine Control (SGT5-2000E/V94.2)

PF0601: Combustion Turbines (GE LM2500)

PF0602: Major Components of the Gas Turbine Assembly (GE LM2500)

PF0603: Gas Turbine Lube and Control Oil Systems (GE LM2500)

PF0604: Air Inlet, Fuel Supply, and Water Injection Systems (GE LM2500)

PF0701: Combustion Turbines (GE Frame 6)

PF0702: Starting Systems and Auxiliary Air Systems (GE Frame 6)

PF0703: Lube, Hydraulic, and Control Oil Systems (GE Frame 6)

PF0704: Combustion Components and Fuel Systems (GE Frame 6)

PF0705: Generator Operations (GE Frame 6)

PF0801: Combustion Turbines (GE Frame 7EA)

PF0802: Starting System and Auxiliary Air Systems (GE Frame 7EA)

PF0803: Lube, Hydraulic, and Control Oil Systems (GE Frame 7EA)

PF0804: Combustion Components and Fuel Systems (GE Frame 7EA)

PF0805: Generator Support Systems (GE Frame 7EA)

PF0901: Combustion Turbine (Siemens V84 2000E)

PF0902: Combustion Turbine Generator Starting and Air System (Siemens V84 2000E)

PF0903: Lube, Shaft, and Control Oil System and the Turning Gear (Siemens V84 2000E)

PF0904: Fuel Systems (Siemens V84 2000E)

PF0905: Combustion Turbine Control (Siemens V84 2000E)

PF2205: Support Systems (GE LM6000) (Part 2)

PF2206: Operations and Maintenance (GE LM6000) (Part 1)

PF2207: Operations and Maintenance (GE LM6000) (Part 2)

PF2208: Performance and Reliability (GE LM6000)

PF2209: Control System (GE LM6000)
SCAFFOLDING

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

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
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.
ARTICULATED DUMP TRUCK OPERATION

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

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

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

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

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

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

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.
WRITING PLANT OPERATING PROCEDURES

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.
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
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
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 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

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, Attemperation, Sootblowing
PF1803: Scale, Deposit, and Fouling
PF2101: Introduction to Performance
PF2102: Boiler Efficiency
PF2104: Miscellaneous Losses
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
LARGE STEAM TURBINE-GENERATOR OPERATIONS

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
COMBINED CYCLE ABNORMAL CONDITIONS

- 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)

CLASSROOM INSTRUCTOR TRAINING

- 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.

EFFECTIVE SIMULATOR INSTRUCTION

- 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.

OPERATIONAL LEADERSHIP AND MANAGEMENT SKILLS

- 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
OP1200: 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
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)

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
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.
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.
**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.
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.

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.

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.

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.

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INTRODUCTION TO LEAN

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

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.
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.
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

- 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
REL-255: Maintenance Planning and Scheduling – For Managers

- 2 Day training option includes Planning & Scheduling Game.
- Discuss management’s role in 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.
MAINTENANCE PLANNING AND SCHEDULING – DAILY MAINTENANCE

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

REL-265: Maintenance Planning and Scheduling – Downdays 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)

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)

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

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.
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)
OS0702: Confined Space Module 2

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)
OS0701: Confined Space Module 1
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
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

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.
**MANAGEMENT & SUPERVISOR HAZMAT TRAINING**

**SAFETY SERIES | APPLIED FUNDAMENTALS**

**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

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.

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)
OSHA 30-HOUR GENERAL INDUSTRY TRAINING

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-OHS-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
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
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 Polarieties DC and Current Flow in Electric Arc Welding With Covered Electrodes
MM2132: Setup of Electric Arc Welding Equipment for SMA Welding in Both Polarieties on Steel Plate
MM2133: Welding Positions and Their Orientations for Pipe Welding
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