



INDUSTRIAL TRAINING COURSES FOR MAINTENANCE PERSONNEL

Instrument Technician, Electrical Technicians and
Mechanical Rotating Equipment Technicians

Honeywell



INTRODUCTION

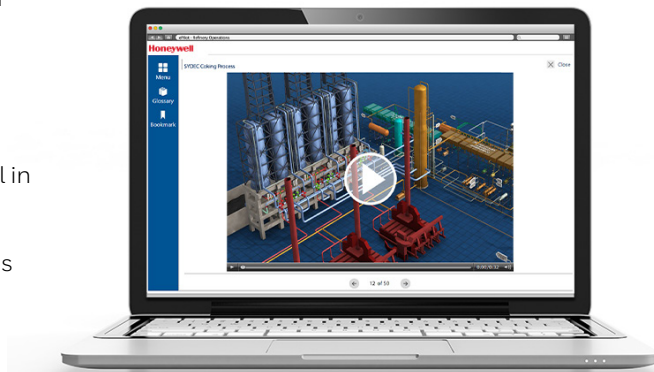
Safe and productive operations rely on skilled and knowledgeable workers. With the right knowledge, operators can anticipate issues and take actions that reduce risk and avoid costly errors.

Honeywell online learning for operator and maintenance gives learners anytime/anywhere access to secure, online learning programs proven to effectively transfer knowledge.

Knowledge gaps in your workforce equal risk. Honeywell identifies the gaps and transfers the required knowledge on demand. Proven instructional design methodology and advanced web technology provide effective knowledge transfer for learners, and our broad range of topics include technical skills, mandated training and process-specific unit operations making our platform the most comprehensive e-learning programs for the oil and gas industry.

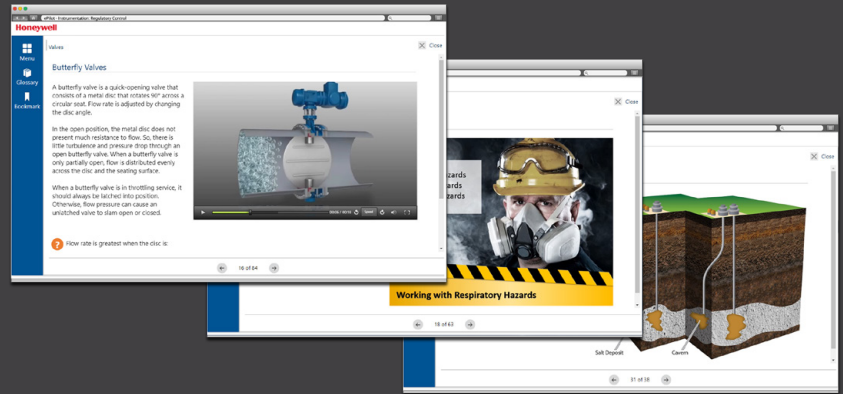
- Self-paced, web-based technology provides immediate feedback and automatic remediation.
- Structured learning is designed for adults according to certified instructional design methodologies.
- Animations and graphics keep learners engaged and present material in easy-to-understand formats.
- Content can be customized with site-specific information and links, as well as language translation.

- Fundamentals
- Core Competency
- Instrumentation
- EI&A MECHANICAL
- Industry Overview
- Process Safety Management
- Turnaround
- Stationary Equipment
- Rotating & Reciprocating
- Production Operations
- Running Maintenance



Honeywell online learning platform offers:

- Detailed Graphics and 3-D Animations
- Intuitive Navigation, Embedded Glossary and Bookmarking
- Translation Capabilities
- Site-Specific Customization
- AICC/SCORM Compliant - Integrates with existing LMS/ERP systems
- Instructor and Participant Guides



CORE COMPETENCY

The challenges brought about by industry consolidation and skilled workforce attrition are changing the nature of work, the knowledge, and the skills workers need to perform. The online learning platform addresses these challenges with deep industry experience, effective knowledge transfer, and job-specific content. Core Competency has always focused on the skills and knowledge required for technicians and operators in the oil and gas industry. Based on the original training program series developed exclusively for the American Petroleum Institute, the learning platform expands this industry-validated content with web technology. Sound instructional design means effective knowledge transfer and reaching competency faster. The Core Competency library contains over 170 learning programs with over 500 hours of online training. Learners have anytime access to the secure, online environment.

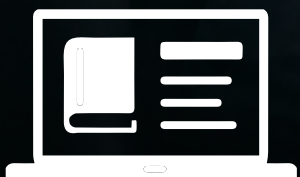
Topics include:

- Fundamentals
- Equipment
- Instrumentation
- Process Operations
- Process Safety
- Production Operations
- Maintenance
- Safe Work Practices





INSTRUMENT TECHNICIAN



COURSES

169



HOURS

356

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ELECTRICITY AND ELECTRICAL EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
DRAWINGS AND DIAGRAMS			
A1186	Electrical System Basics and Diagrams	In Electrical System Basics, you will learn about electrical generation and transmission, system voltages, and building schematic diagrams; Single line drawings, electrical symbols, and logic symbols and gates; and low and medium voltage motor drives and drive circuits.	3
ELECTRICAL AND COMMUNICATION CABLES			
PS-EIA-CDB-101	Cable Duct Banks and Trays	In Cable Duct Banks and Trays, you will learn about types of duct banks, cable tray configurations, cable tray applications, proper loading and support, wiring fill and space requirements, securing cables, and proper grounding and bonding.	1
PS-EIA-CAB-101	Electrical Cables	In Electrical Cables, you will learn about the function of electrical conductors, characteristics of conductor materials, conductor construction, wiring size and rating, insulation materials, and grounding.	1
PS-EIA-FOC-101	Fiber Optic Cable	In Fiber Optic Cable, you will learn about types of fiber optic cable, connectors, operation, joining optical fibers, common causes of optical loss, and fusion splicing.	1
PS-EIA-PCB-101	Power Cables	In Power Cables, you will learn about the different types of power cables, wire characteristics, properties, and sizes; insulation, cable glands, cabling systems and installations; power cable maintenance, repair, troubleshooting, and testing.	3
ELECTRICAL FUNDAMENTALS			
PS-EIA-BED-101	Basic Electronics	In Basic Electronics, you will learn about basic electricity; basic electronics, including voltage, ground, current, resistors, capacitors, and inductors; electrical circuits, including Ohm's and Kirchhoff's Laws; current, voltage, and power; series and parallel DC circuits, transistors and capacitors.	1.5
PS-EIA-EDO-101	Electrical Documentation	In Electrical Documentation, you will learn about types of electrical documentation, electrical loop numbers and symbols; power distribution and cable layout diagrams; control/schematic diagrams; protection and hazardous area diagrams; updating, storing, and controlling diagrams.	1.5
A1620	Electrical Fundamentals	The first section of Electrical Fundamentals describes units of electrical measurement, states Ohm's law and shows some of its uses, and describes and shows differences between series and parallel circuits. This section also shows some of the effects of resistance in series and parallel circuits, the use of resistance as voltage dividers, and ways to produce and make use of voltage drop. Next, the program describes how a magnetic field is produced and how magnetic fields are used in motors, measuring devices, and as resistors in electrical circuits and devices. You will also learn about the effects produced by alternating current, which describes alternating current, voltage and current phases, self-inductance, inductive reactance, the use of capacitors in AC circuits, and the use of induction coils as transformers. The program concludes with basic electronics, which briefly describes diodes and transistors and shows how they are used to rectify current and amplify electrical signals. This section also introduces simple transistor circuits and describes the use of capacitors in such circuits.	4
PS-EIA-GRD-101	Grounding	In Grounding, you will learn about different types of grounding systems, equipment and static grounding, lightning protection, bonding techniques, electronic system and substation grounding; ground fault monitoring, inspecting grounding and bonding systems; and tracing ground faults.	3
A1185	Understanding Electricity	In Understanding Electricity, you will learn how to safely work with electricity. You will learn about basic electrical terms, the effect of electric current on the human body, and why electricity is a potential hazard. Additionally, you will learn about grounding electrical equipment, the proper precautions you must take when working with electrical equipment, and how to act in an emergency. The Electric Power Distribution System section describes how electric power is distributed from a generating plant to a lease. Finally, you will learn about measuring electric usage, including units of measurement and how to read a meter.	4
MOTORS			
PS-MNT-CMO-101	Condition Monitoring - Electrical Motors	In Condition Monitoring - Electrical Motors, you will learn about induction and DC motor related problems including SCR problems, DC Comparator cards, and vibration analysis.	1
PS-EIA-EMO-101	Electrical Motor Properties, Troubleshooting and Maintenance	In Electrical Motor Properties, Troubleshooting and Maintenance, you will learn about common properties; voltage selection factors, insulation and thermal properties, enclosures and bearings; routine and preventive maintenance, and troubleshooting.	5
PS-EIA-EMO-102	Introduction to AC/DC Electrical Motors for Technicians	In Introduction to AC/DC Electrical Motors, you will learn about magnetism, producing alternating current, rotating magnetic fields, types of AC motors and AC motor properties; DC motor types and operation.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-MSA-101	Motor Signature Analysis (MCE)	In Motor Signature Analysis (MCE), you will learn about MCE functionality and detectable faults; test data analysis information, such as resistance-to-ground, setting warning levels, DC assets, RTG readings interpretation, capacitance-to-ground, phase-to-phase resistance and inductance, test lead check, resistive and inductive imbalance, average inductance, polarization index test, PI and DA data interpretation, rotor position an aliasing, data interpretation, and DC bar-to-bar test; and MCE troubleshooting.	3
POWER SYSTEMS			
PS-EIA-BAT-101	Batteries	In Batteries, you will learn about battery components, types of cells, series and parallel connections, battery capacity and ratings, lead acid and Ni-Cad batteries; battery system performance; failure analysis and dual battery backup systems, system testing methods; preventive maintenance and safety concerns; and failure modes and system troubleshooting.	5
PS-EIA-CPB-101	Capacitor Banks	In Capacitor Banks, you will learn about capacitor theory, including capacitive resistance, power triangle, and power factor correction; harmonic distortion, resonance, and filters; power factor correction capacitor (PFCC) degradation; and capacitor bank maintenance and troubleshooting.	2
PS-EIA-PDT-101	Power and Distribution Transformers	In Power and Distribution Transformers, you will learn about basic transformer operation, types, components, connections, and operational parameters; transformer cooling; schematic symbols; and maintaining and troubleshooting low-, medium-, and high-voltage power transformers.	2
PS-EIA-PDT-102	Transformer Maintenance	In Maintenance for Power and Distribution Transformers, you will learn about maintaining and troubleshooting low-, medium-, and high-voltage power transformers.	1.5
PS-EIA-UPS-101	Uninterruptible Power Supply	In Uninterruptible Power Supply, you will learn about emergency and standby power systems, emergency power requirements, critical and essential load; UPS types and operation; DC UPS, UPS batteries, battery ratings and failures; maintenance and functional load testing; and UPS troubleshooting.	3
SWITCHGEAR			
PS-EIA-ARC-101	Arc Flash Causes and Mitigation	In Arc Flash, you will learn about arc flashes associated with electrical faults, personal protective equipment used to protect workers from arc flashes, and different switchgear including vacuum, air, gas and oil circuit breakers used to minimize the damage caused by contact arcing.	2
PS-EIA-CBR-101	Circuit Breakers	In Circuit Breakers, you will learn the basics of overcurrent protection, types of fuses and voltage level classifications; different types of circuit breakers, their rating and operation; and maintaining, monitoring, inspecting, and troubleshooting low voltage air and medium voltage vacuum power circuit breakers.	4
PS-EIA-GHS-101	Gas Insulated Substations (GIS) and Sulfur Hexafluoride (SF6)	In Gas Insulated Substations (GIS) and Sulfur Hexafluoride (SF6), you will learn about GIS, sulfur hexafluoride (SF6) properties, testing metrics, proper handling of faulted and non-faulted SF6; leak detection methods, and recordkeeping.	2.5
PS-EIA-GIS-101	High Voltage Gas Insulated Switchgear (GIS)	In High Voltage Gas Insulated Switchgear (GIS), you will learn about high voltage circuit switchers, circuit switcher construction, operating principles, safety, preventive maintenance; SF6 properties and handling; PPE and safety equipment, typical failures, and troubleshooting.	2
PS-EIA-HSS-101	High Voltage Substation Switchgear	In High Voltage Substation Switchgear, you will learn about substation switchgear and circuit breaker control, types of HV circuit breakers, HV relay protection, switchgear classification and operation, switchgear maintenance, handling SF6, and troubleshooting HV switchgear.	2
PS-EIA-LAR-101	Lightning Arrester	In Lightning Arresters, you will learn about lightning surges and strikes; lightning protection and arresters, including classes and types of lightning arresters; grounding and installation guidelines; basic safety precautions; and lightning arrester troubleshooting.	3
PS-EIA-LVS-101	Low Voltage Substation Switchgear	In Low Voltage Substation Switchgear, you will learn about switchgear terminology and construction, including indoor and outdoor switchgear, bus bars, metering, circuit breakers, and wiring; switchgear operation, preventive maintenance, typical failures, and general guidelines for troubleshooting.	3
PS-EIA-LVI-101	LV Intelligent Switchgear	In LV Intelligent Switchgear, you will learn about low voltage intelligent switchgear components, monitoring functions and preventive maintenance; MCU parameterization, failure codes, and terms and abbreviations; LV switchgear and communications troubleshooting.	3
PS-EIA-MVS-101	Medium Voltage Substation Switchgear	In Medium Voltage Substation Switchgear, you will learn about types of switchgear and typical layouts, medium voltage operation, component functions, maintenance, and troubleshooting.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-MVV-101	Medium Voltage Vacuum Contactors	In Medium Voltage Vacuum Contactors, you will learn about types of switches, disconnectors, contactors, circuit breakers, vacuum contactors and principles of operation; preventive maintenance and integrity testing; and basic troubleshooting guidelines.	2
PS-EIA-PRE-101	Protective Relays	In Protective Relays, you will learn about electrical system problems, types of protective relays, sensing equipment, transformers, relay numerical function types, protection schemes and strategies; zones of protection and feeder circuits; setting and adjusting protective relays, and troubleshooting electromechanical and electronic protective relay systems.	3

GENERAL KNOWLEDGE AND SKILLS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BEST PRACTICES			
A1137	Performing Skills Assessment	A performance assessment is a tool that is used to measure, maintain, and improve the behaviors associated with completing a task. Within a process facility, it is imperative that tasks be completed in a safe manner. Safety procedures specify how employees must complete each task within a process facility. In this program, you will learn how to assess job performance to ensure that each employee performs their assigned tasks in a safe manner.	1
PS-MNT-RAC-101	Reports and Communication	In Reports and Communication, you will learn about giving oral reports, including preparation, delivery, visual aids, and handouts; how to structure technical reports; and how to update and mark up diagrams and schematics.	1
DRAWINGS AND DIAGRAMS			
PS-MNT-ENG-101	Engineering Drawings and Symbols	In Engineering Drawings and Symbols, you will learn about the different types of engineering drawings, different drawing formats used in creating engineering drawings, the different areas of the drawing, the types of symbols used.	0.5
GENERAL OPERATIONS KNOWLEDGE			
PS-EIA-EFA-101	EI&A Field Awareness	In EI&A Field Awareness, you will learn about electrical power systems, emergency power systems, AC and DC UPS; cathodic protection, heat tracing, lighting and grounding systems; types of instrumentation systems; types of analyzer systems, and hazard awareness.	4
PS-EIA-HAP-101	Hazardous Area and Protection Classifications	In Hazardous Area and Protection Classifications, you will learn about hazardous areas, the combustion triangle, determining area classifications; IEC and NA protection classifications; and IP and NEMA equipment protection codes.	2
HAND TOOLS AND EQUIPMENT			
PS-EIA-TTF-101	Electrician's Tools and Test Equipment	In Electrician's Tools and Test Equipment, you will learn about types of electrician's tools; electrical test equipment, including analog and digital multimeters, ammeters, circuit tracers, insulation testers, phase and motor rotation meters, power analyzers, wire sorters, and other test equipment; instrumentation and calibration.	4
PS-MNT-HTM-101	Hand and Power Tools for Technicians	In Hand and Power Technicians, you will learn about hand tools, cutting tools and power tools; and how to select, use and maintain them safely and efficiently.	3.5
A1208	Working with Power Tools	Maintenance activities usually involve the use of some tools. Each of these tools is designed to perform a specific job. You must be able to select and operate the correct power tool for a particular job. In this program, you will learn the purpose, function and proper orientation of power tools. You will learn specific requirements of each type of power tool and how to use them safely.	2

GENERAL MAINTENANCE SKILLS AND KNOWLEDGE

COURSE #	COURSE TITLE	DESCRIPTION	HRS
CORROSION CONTROL			
PS-MNT-CPS-101	Cathodic Protection Systems	In Cathodic Protection Systems, you will learn about using cathodic protection to control metal surface corrosion, including: galvanic protection and anodes, impressed current and rectifier systems; cathodic protection surveys, inspection, testing, and record-keeping; and cathodic system safety, maintenance, and troubleshooting.	3
A1122	Corrosion Control	This program will teach you the basics of the corrosion process, the methods used to monitor the rate of corrosion and the control techniques used to protect equipment. By successfully controlling corrosion, the destructive effects can be minimized, and facility operations can be more profitable.	4
PS-MNT-COR-101	Corrosion in Metal	In Introduction to Corrosion, you will learn about the corrosion process, including metal corrosion, corrosion damage, and corrosion cells; and corrosion control, including cathodic protection, protective coatings, corrosion monitoring and measurement, and corrosion monitoring techniques.	3
DRAWINGS AND DIAGRAMS			
PS-MNT-MND-101	Manuals and Drawings	In Manuals and Drawings, you will learn about maintenance drawings, orthographic, process flow, piping and instrumentation, and schematic drawings; reading drawings and blueprints; standards organizations; and operations and maintenance manuals.	2
FILTERS			
PS-MNT-DCF-101	Dust and Coalescer Filters	In Dust and Coalescer Filters, you will learn about the application and workings of coalescing filters, the purpose of dust filters, and how to safely remove and install filter elements.	1
PS-MNT-FTS-101	Filters and Strainers	In Filters and Strainers, you will learn about filtration, filter media, and operation; mechanical, absorbent, and adsorbent filters; Y-basket and temporary (geometric) strainers; filter and strainer cleaning and maintenance.	2
GENERAL MAINTENANCE CONCEPTS			
PS-MNT-CMB-101	Condition Monitoring - Balancing	In Condition Monitoring - Balancing, you will learn balance quality grades and standards, calculating imbalance, vibration; in-place and single plane balancing, the four-step balancing method and balancing in one run; field balancing, and balancing in two planes.	2.5
PS-MNT-CMG-101	Condition Monitoring - General	In Condition Monitoring - General, you will learn about life, preventive, reactive, and predictive maintenance; potential fault analysis (PFA); vibration analysis, including imbalance, misalignment, and looseness analysis; and maintenance and maintainability data.	3
PS-MNT-FDT-101	Fault Diagnosis, Troubleshooting and Machine Inspections	In Fault Diagnosis, Troubleshooting and Machine Inspections, you will learn about common techniques of diagnosing and troubleshooting machine failures including Fault Tree Analysis (FTA) and Failure Mode and Effects Analysis (FEMA), machine performance monitoring, troubleshooting techniques using operation records, vibration analysis, and lubricating oil analysis and the non-destructive testing (NDT) methods of visual inspection, liquid penetrant, magnetic particle, ultrasonic, radiography and eddy current.	1.5
PS-MNT-CPM-101	Fundamentals of Condition and Predictive Monitoring	In Fundamentals of Condition and Predictive Monitoring, you will learn about the many different ways of monitoring the mechanical condition of equipment including vibration analysis, oil and wear debris analysis, ultrasonics, and infrared thermography.	1
PS-MNT-ITP-101	Insulation and Thermal Protection	In Insulation and Thermal Protection, you will learn about the purpose, types and applications of insulation and thermal protection.	0.5
PS-MNT-MFD-101	Maintenance Fundamentals	In Maintenance Fundamentals, you will learn about the principles and types of maintenance, including proactive, preventative, corrective, breakdown, and turnaround maintenance; and maintenance workflow planning and strategies.	1
PS-MNT-PCB-101	Planned, Corrective, and Breakdown Maintenance	In Planned, Corrective, and Breakdown Maintenance, you will learn planned, corrective, and breakdown maintenance, including planning, implementing, and executing maintenance schedules.	1.5
PS-MNT-PMP-101	Preventative Maintenance Plans	In Preventative Maintenance Plans, you will learn about the basic steps involved with the development of a preventive maintenance plan as well as the benefits of such a plan including: benefits, purpose, the Development process and principles of the program.	0.5
LEAK DETECTION			
PS-MNT-LDR-101	Leak Detection in Refrigeration Lines	In this program, you will learn about different methods for detecting and repairing leaks in refrigerant lines	1
PIPES, HOSES AND FITTINGS			
PS-MNT-PTF-101	Pneumatic Tubing and Fittings	In Pneumatic Tubing and Fittings, you will learn about pneumatic tubing applications, tubing types, how to select the proper tubing, types of pneumatic fittings, and tubing installation guidelines.	1

INSTRUMENTATION AND CONTROL

COURSE #	COURSE TITLE	DESCRIPTION	HRS
ANALYZERS AND INFERENTIALS			
PS-EIA-ASC-101	Analyzer Sampling and Conditioning System	In Analyzer and Conditioning Systems, technicians will learn about process sampling, sampling probes, sample transfer and return lines, and sampling time; factors affecting the sample conditioning system; and how to troubleshoot sampling and conditioning systems.	1
PS-EIA-ANS-101	Analyzer Shelters	An analyzer shelter is designed to provide a safe and environmentally-controlled atmosphere for plant analyzers. In Analyzer Shelters, you will learn about enclosure and building (walk-in) types of shelters; analyzer shelter components and safety systems; and shelter troubleshooting.	1
PS-EIA-CHA-101	Chlorine Analyzers	In Chlorine Analyzers, you will learn about colorimetric and amperometric chlorine analyzers, calibration, routine maintenance and troubleshooting.	1.5
PS-EIA-DOA-101	Dissolved Oxygen Analyzers	In Dissolved Oxygen Analyzers, you will learn about electrochemical and optical (luminescent) techniques for measuring the amount of dissolved oxygen in a process stream, and analyzer calibration and troubleshooting.	1
PS-EIA-GCH-101	Gas Chromatography	In Gas Chromatography, you will learn about gas chromatography separation techniques, chromatograms, components, calculating component concentration, calibration, and troubleshooting hardware and programming failures.	3
PS-EIA-GDA-101	Gas Density Analyzers	In Density Analyzers, you will learn about gas density analyzers, the Wobbe Index, and density measurement techniques, including vibrating cylinder and combustion calorimeter configurations; specific gravity analyzers; and calibrating and troubleshooting gas density analyzers.	1.5
PS-EIA-MFA-101	Melting Flow Rate Analyzers	In Melting Flow Rate Analyzers, you will learn about weighted piston and pump type melting flow rate analyzers, calibration, and troubleshooting.	1.5
PS-EIA-MAN-101	Moisture Analyzers	In Moisture Analyzers, you will learn about dew point, moisture content, relative humidity, vapor pressure, partial pressure, types of sensors and their features; and how to calibrate and troubleshoot them.	1
PS-EIA-NRL-101	Nuclear Radiation Level Measurement	In Nuclear Radiation Level Measurement, you will learn nuclear radiation level detection, radioactive materials, sources, and types of detector devices; configuration, calibration, safety, and troubleshooting.	1.5
PS-EIA-OXA-101	Oxygen Analyzer	In Oxygen Analyzer, you will learn about paramagnetic, thermoparamagnetic, and conductivity sensors, procedures for calibrating, and analyzer troubleshooting.	1.5
PS-EIA-PAN-101	pH Analyzers	In pH Analyzers, you will learn about pH measurement indicators, probes, transmitters, and effects of process temperature; one- and two-point calibration, and pH analyzer troubleshooting.	1.5
PS-EIA-PHA-101	Photometric Analyzers	In Photometric Analyzers, you will learn about energy absorption, photometric analyzer components, including sources, sample cells, wavelength selectors, detectors, electronics and output; different photometer configurations, and how to calibrate and troubleshoot photometric analyzers.	2
PS-EIA-PHM-101	Understanding pH Measurement	In Understanding pH Measurement, you will learn about pH, how it is measured with both Colorimetric and pH meters, and how to calibrate a pH meter.	1
CONTROL SYSTEMS			
PS-MSO-ACA-101	Automated Control Applications	In Automated Control Applications, you will learn about on/off control systems; process dynamics, electronic proportional, integral, and derivative (PID) control; analog electronic controllers including operational amplifiers (op-amps) and automatic process control.	3
PS-EIA-CTL-101	Control Loops	In Control Loops, you will learn about control loops and controller action, including control types, controllers, variables, control modes; types of control schemes, including cascade, ratio, split range, feedforward, multivariable and adaptive control; and control loop tuning techniques.	3
PS-EIA-CSN-101	Control Systems - SCADA, DCS and ESD	In Control Systems - SCADA, DCS and ESD, you will learn about control systems and basic feedback control; distributed control systems (DCS), including field I/O, process controllers, communications, redundancy, and operations; supervisory control and data acquisition (SCADA) systems, including field I/O, master and remote stations, along with their associated software components; and Emergency Shutdown Systems (ESD).	2
PS-EIA-SCA-101	Introduction to Supervisory Control and Data Acquisition (SCADA)	In Introduction to SCADA Systems, you will learn about Supervisory Control and Data Acquisition (SCADA) and Distributed Control Systems (DCS). SCADA function and basic elements are described, including HMIs, PLCs, and RTUs, along with SCADA communications.	.75

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-CSN-102	Network and Communication Systems	In Network and Communications, you will learn about communication networks, transmission modes, encoding, communication speeds, data error detection, common industrial communication standards and protocols, including HART, FOUNDATION Fieldbus, Modbus, and Profibus / PROFINET networks.	1.5
PS-EIA-SIC-101	Safety in Instrumentation and Control Systems	In Safety in Instrumentation and Control Systems, you will learn about emergency shutdown systems, standards, safety system technologies, SIS architecture; system integrity levels (SIL), equipment failure modes and analysis, SIS factors, and procedures for overriding ESD and SIL systems.	3
PS-EIA-SCA-101	SCADA Operation	In SCADA Operation, you will learn about the SCADA system, function, and components, general operation and changing a setpoint. You will also learn about control room cold and warm start-ups, including cold start-up pre-checks and typical start-up screens. Control room facility shutdown is covered, with switch and display guidelines, and an extraction plant shutdown example. Finally, you will learn about control room emergency shutdown recovery.	1
PS-EIA-SCS-101	Simple Control System (PLC)	In Simple Control Systems, you will learn about PLC fundamentals, including architecture, basic PLC control and programming, external functions and hardware; PLC maintenance, and general troubleshooting.	2
CUSTODY TRANSFER			
PS-EIA-CSM-101	Custody Meters	In Custody Meters, you will learn about custody transfer systems, types of meters and metering components, meter accuracy and standards, flow meter applications, meter proving; and calibrating and troubleshooting custody meters.	2.5
DRAWINGS AND DIAGRAMS			
A2067	Process and Instrumentation Drawings	A company may have several production processes. Having uniform standards for instrumentation systems used for measurement and control simplifies and helps explain the process. In this program, you will learn standard symbols used in instrumentation systems how to apply them.	2
ELECTRICAL MEASUREMENT			
PS-EIA-CDA-101	Conductivity Analyzers	In Conductivity Analyzers, you will learn about inductive and contactive conductivity measurement, effect of temperature on conductivity; and conductivity analyzer operation, installation, calibration, and troubleshooting.	1.5
PS-EIA-ELM-101	Electrical Level Measurement	In Electrical Level Measurement, you will learn about resistance, conductance, and capacitance level measurement; capacitance level probes, and calibrating and troubleshooting electrical level measurements.	1
FLOW MEASUREMENT			
PS-EIA-DPR-101	Differential Pressure Flow Measurement	In Differential Pressure Flow Measurement, you will learn about fluid flow, flow conditioners, flow measurement, Reynold's Number and flow equation factors; orifice plate construction, types, designs, pressure taps, removing orifices; other flow meters; differential pressure transmitters; and calibrating and troubleshooting differential pressure flow meters.	2.5
PS-EIA-FGR-101	Flow Gauging (Rotameter)	In Flow Gauging (Rotameter), you will learn about measuring flow rate with a rotameter, glass, plastic, and metal types of rotameters, and fault conditions.	1
A2064	Instrumentation: Measuring Flow	Instrumentation is a series of learning programs designed to provide operators with a general sense of how instrumentation plays its role in the efficient operation of a refinery. In Measuring Flow, you will learn about flow rate and measurements, including differential pressure and positive displacement flow meters.	3
PS-EIA-MFM-101	Mass Flow Measurement	In Mass Flow Measurement you will learn about the features of coriolis and thermal mass meters, and how to calibrate and troubleshoot them.	1
PS-EIA-VMF-101	Volumetric Flow Measurement	In Volumetric Flow Measurement, you will learn about positive displacement and velocity flow meters, calibration, and troubleshooting.	1.5
LEVEL MEASUREMENT			
PS-EIA-HHL-101	Hydrostatic Head Level Measurement	In Hydrostatic Head Level Measurement, you will learn about open and closed tank measurement, adjustments, zero suppression and zero elevation, dry and wet leg closed tank measurement.	1
PS-EIA-HHL-102	Hydrostatic Head Level Measurement - Device Troubleshooting and Calibration	In Hydrostatic Head Level Measurement - Device Calibration and Measurement, you will learn about calibrating techniques and troubleshooting errors and faults for instruments and devices dealing with hydrostatic head level measurement,	1

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-MLL-101	Microwave and Laser Level Measurement	In Microwave and Laser Level Measurement, you will learn about guided wave and non-contacting wave level measurement, laser level measurement, calibration and troubleshooting.	1.5
PS-EIA-PLS-101	Point Level Switches	In Point Level Switches, you will learn about point and continuous level measurement; safety switch components, types of switches, including ball (float), displacer, vibrating point, ultrasonic, capacitance probe, conductive, and radiation or nuclear level switches; and how to calibrate and troubleshoot them.	1.5
PS-EIA-SFG-101	Sight and Float Gauging	In Sight and Float Gauging, you will learn about types of gauge glasses, magnetic level indicators, float and tape gauges; calibrating float and tape gauges; cleaning gauge glasses, and troubleshooting sight and float gauges.	2
PS-EIA-TGS-101	Tank Gauging System	In Tank Gauging System, you will learn about the float and tape and displacer and servomotor methods of tank gauging; displacer installation, output signals, calibration, and troubleshooting.	1.5
PS-EIA-ULM-101	Ultrasonic Level Measurement	In Ultrasonic Level Measurement, you will learn about ultrasonic waves, measurement, installation, non-invasive transducers, calibration, and troubleshooting.	1
MEASUREMENT FUNDAMENTALS			
PS-EIA-MCB-101	Measurement and Calibration Basics	In Measurement and Calibration Basics, you will learn about measurement technology, including range, span, turndown ratio, accuracy, repeatability, linearity, resolution, hysteresis, error, measured and actual values; measurement devices, calibration terminology and equipment, and safety.	2
PRESSURE MEASUREMENT			
PS-EIA-PRM-101	Pressure Measurement	In Pressure Measurement, you will learn about types of pressure, pressure and thermodynamics, primary elements, such as bourdon tubes, bellows, diaphragms, capsules, piezoelectric sensors, and strain gauges; pneumatic instruments, pressure regulators; and device installation, calibration, and troubleshooting.	2
TEMPERATURE MEASUREMENT			
PS-EIA-TPM-101	Temperature Measurement	In Temperature Measurement, you will learn about heat transfer, and temperature sensing devices, including thermometers, bimetallic strips, filled thermal systems, RTDs and thermistors, thermocouples and thermowells; calibration procedures, and troubleshooting.	2.5

MATH AND SCIENCE FUNDAMENTALS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BASICS OF MATHEMATICS			
A1130	Process Plant Mathematics	In Process Plant Mathematics, you will learn about the principles and operations involving mathematics within a process facility, including addition, subtraction, multiplication, and division of fractions and decimals. You will also learn about using percentages, ratios, proportions, and triangles to solve problems involving process plant activities, such as mixing liquids, determining actual amounts in storage, and angle fitting.	5
A1181	Hydrocarbon Chemistry 101	In Hydrocarbon Chemistry 101, you will learn about basic hydrocarbon composition and properties; carbon and hydrocarbon bonding; hydrocarbon structures and types of formulas. You will also learn about alkanes/paraffins, saturation, alkenes/olefins, alkynes/acetylenes, structural (constitutional) isomers and stereoisomers; and saturated and unsaturated ring hydrocarbons. Finally, you will learn about hydrocarbon nomenclature: naming conventions, how isomers and ring hydrocarbons are named, IUPAC naming rules, and nomenclature for other organic compounds.	3
BASICS OF HYDROCARBON CHEMISTRY			
A1180	Process Plant Chemistry	In this program, you will learn about the basic chemistry behind the refining process. You will learn basic chemical terminology, molecular formulas, structural formulas, some common chemical symbols, and the various hydrocarbon groups used within the petrochemical industry. This program is designed to provide a background in the chemical nature of the operator's job, work environment, and products of refining.	2

PETROLEUM INDUSTRY OVERVIEW

COURSE #	COURSE TITLE	DESCRIPTION	HRS
GAS PROCESSING			
PS-EPT-INO-114	Gas Processing Overview	In Gas Processing Overview, you will learn about saleable products recoverable from raw, produced gas; gas composition and contaminants; sales gas specifications; gas sweetening and dehydration; hydrocarbon liquid products and extraction processes, Nitrogen removal and helium recovery; NGL fractionation/stabilization; NGL product treating; and sulfur recovery and disposal.	3
INDUSTRY OVERVIEW			
PS-EPT-INO-101	Modern Oil and Gas Industry	In Modern Oil and Gas Industry, you will learn about the historical, geographical, and modern context of the petroleum industry; its organization, the petroleum value chain, and economic drivers.	2
MIDSTREAM INDUSTRY SEGMENT			
PS-EPT-INO-112	Overview of the Midstream Industry Segment	In Overview of the Midstream Industry segment, you will learn about the Petroleum Value Chain, the midstream segment, conventional and unconventional reservoirs, the crude oil and natural gas value chains and value chain investment trends; natural gas terminology, global energy demand and trade, gas production and contracts; and gas processing, including end use products, contaminants and sales gas specifications, gas conditioning, dehydration, hydrocarbon dewpoint control, NGL extraction and stability, and NGL product treating.	3
PETROCHEMICALS			
PS-EPT-INO-119	Introduction to Solvents	In Introduction to Solvents, you will learn about basic solvent chemistry, its purpose and selection. Solvent chemistry, including types of bonds, electronegativity, and polar bonds are covered. Polar (protic and aprotic) and non-polar types of solvents are explained, as well as what defines organic and inorganic solvents. Chemical and hydrocarbon solvent properties, are covered, such as viscosity, solubility, relative evaporation rate (RER), density, and surface tension, along with health, safety, and environmental considerations. Finally, you will learn about solvent applications, such as paints, sealants, cleaners, and polishes; drilling and metalworking fluids; water treatment; pesticides; concrete release fluids, and heat transfer fluids.	2
PS-EPT-INO-117	Steam Cracking	Steam cracking is the main production process for petrochemicals, including ethylene, propylene and butadiene. The process involves breaking long chain hydrocarbons into shorter chains. In "Steam Cracking", you will learn about types of steam crackers and the functions performed in key areas, including the furnace, quench, compression, and chilling and separation sections. You will also learn about the difference between conversion and selectivity and the factors that affect ethane selectivity.	1
PIPELINE SYSTEMS			
PS-EPT-INO-113	Pipelines and Storage Systems	In Pipelines and Storage Systems, you will learn about the different hydrocarbon transportation systems, advantages of pipelines, pipeline projects, pipeline construction and types of pipelines; pipeline system design and components; pipeline problems and protection; and pigging. In addition, you will learn about hydrocarbon storage systems for liquids and gases, including appropriate types of tank designs and use of depleted reservoirs and salt caverns.	2
REFINING			
PS-EPT-INO-115	Fundamentals of Refining	In Fundamentals of Refining, you will learn about the refining industry as part of the downstream petroleum value chain including characteristics of crude oil and the refining products made from it, refining economics, a typical refinery configuration with its process streams and units.	2
SURFACE PROCESSING			
PS-EPT-INO-111	Surface Processing of Produced Fluids	In Surface Processing of Produced Fluids, you will learn about the integrated production system, fluid separation, emulsion breaking, crude products, gas separation and natural gas processing, NGL usage, and natural gas conversion to LNG and GTL.	1

PROCESS SAFETY

COURSE #	COURSE TITLE	DESCRIPTION	HRS
EMERGENCY PLANNING & RESPONSE			
A1112	Fire Fighting: Extinguishing Agents	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Extinguishing Agents, you will learn about the use of water, foam, carbon dioxide, dry chemicals, halons, and dry powders for controlling or extinguishing fires and for protecting men and equipment. You will also learn about proper hose handling and how to use small and large handlines, monitors, and fixed spray systems.	4
A1111	Fire Fighting: Fuels and Combustion	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Fuels and Combustion, you will learn that fire is combustion requiring fuel, oxygen, and a source of ignition. You will also learn about the flammability of typical liquid and vapor fuels, the sources of oxygen, the sources of ignition, and the causes and effects of various kinds of explosions and detonations. Finally, you will learn the three ways of extinguishing fires—quenching, smothering, and starving—and the techniques of dispersing flammable vapors to keep them from igniting or re-igniting during a fire.	3
A1113	Fire Fighting: Portable Fire Extinguishers and Foams	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, you will learn about portable fire extinguishers, which are the first line of defense in many fire situations. This program covers how to select and operate them properly. You will also learn about the construction of CO2 and dry chemical extinguishers and how they are used for putting out small fires. Finally, you will learn about the use of foam for extinguishing large area flat fires, and how both chemical foams and air foams are prepared and applied.	4
A1114b	Fire Fighting: Strategies	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. Your ability to prevent a fire or react to a fire emergency may depend on how well you planned ahead for that particular situation. Planning ahead means that you have identified fire problem areas, developed the appropriate action plans, and prepared to fight a fire with the proper firefighting equipment, techniques and tactics. In this program, you will learn pre-fire planning and basic strategy. You will also learn strategies for fighting tank and dike fires. Finally, you will apply what you have learned in exercises that cover all different types of fires.	3
A1114a	Fire Fighting: Tactics	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. The way you attack a fire depends on several different factors, including how the fuel is burning and the location of the fire. It is important that you know and can implement the correct attack for any type of fire. In this program, you will learn the tactics of hose handling, of operating valves under fire exposure, of using dry chemical and foam, and of protecting pressure vessels.	3
SAFE WORK PRACTICES			
A1197	Job Hazard Analysis and Stop Work Authority	Working within the process industry can result in exceptionally high safety risks, and employers put programs in place to reduce the likelihood of accidents and injuries. Job Safety Analysis (JSA) and Stop Work Authority (SWA) require all employees to watch for safety risks and potential hazards. In this program, you will learn about JSAs and SWA and how you can help implement both.	1
A1170	Safe Handling of Light Ends	In this program, you will learn the physical properties of gaseous hydrocarbons that create hazards, and the special handling and safety procedures that are required.	3

PRODUCTION OPERATIONS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PROCESS SAFETY MANAGEMENT			
A1638	SEMS Standard and Requirements	In SEMS Standards and Requirements, you will learn about the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety Environmental Enforcement (BSEE) regulations established in 30 CFR, 250, Subpart S.	1
PSST (T2)			
A1639	Reducing Marine Trash and Debris	Reducing Marine Trash and Debris is designed to help you meet the training requirements of 30 CFR 250.300 (a) and (b)(6). It covers information related to marine trash and debris in offshore environments, including how to report pollution, and how to prevent it.	1
A1632	Well Control and Production Safety Regulations	In this third program in the series, operators will learn about regulatory requirements governing well control and production safety duties specified in 30 CFR 250, including pollution prevention requirements, well completion requirements, and oil and gas drilling requirements. This program is designed for Mechanics and Electricians, "B" Operators, Instrument and Electrical Technicians, "A" Operators, Senior (Lead) Operators, Production Foremen and/or other positions.	3

REFINERY OPERATIONS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
TURNAROUND			
PS-REF-TUR-101	Turnaround Operations	During process operations, equipment becomes less flexible and increasingly unable to reach maximum production capacity because operating conditions deteriorate. To keep conditions optimal for production, process facilities schedule turnaround (T/A) operations to restore unit operating capabilities. In this series, you will learn about T/A operations, how they are implemented, and the overall impact a turnaround operation has on facility costs.	5

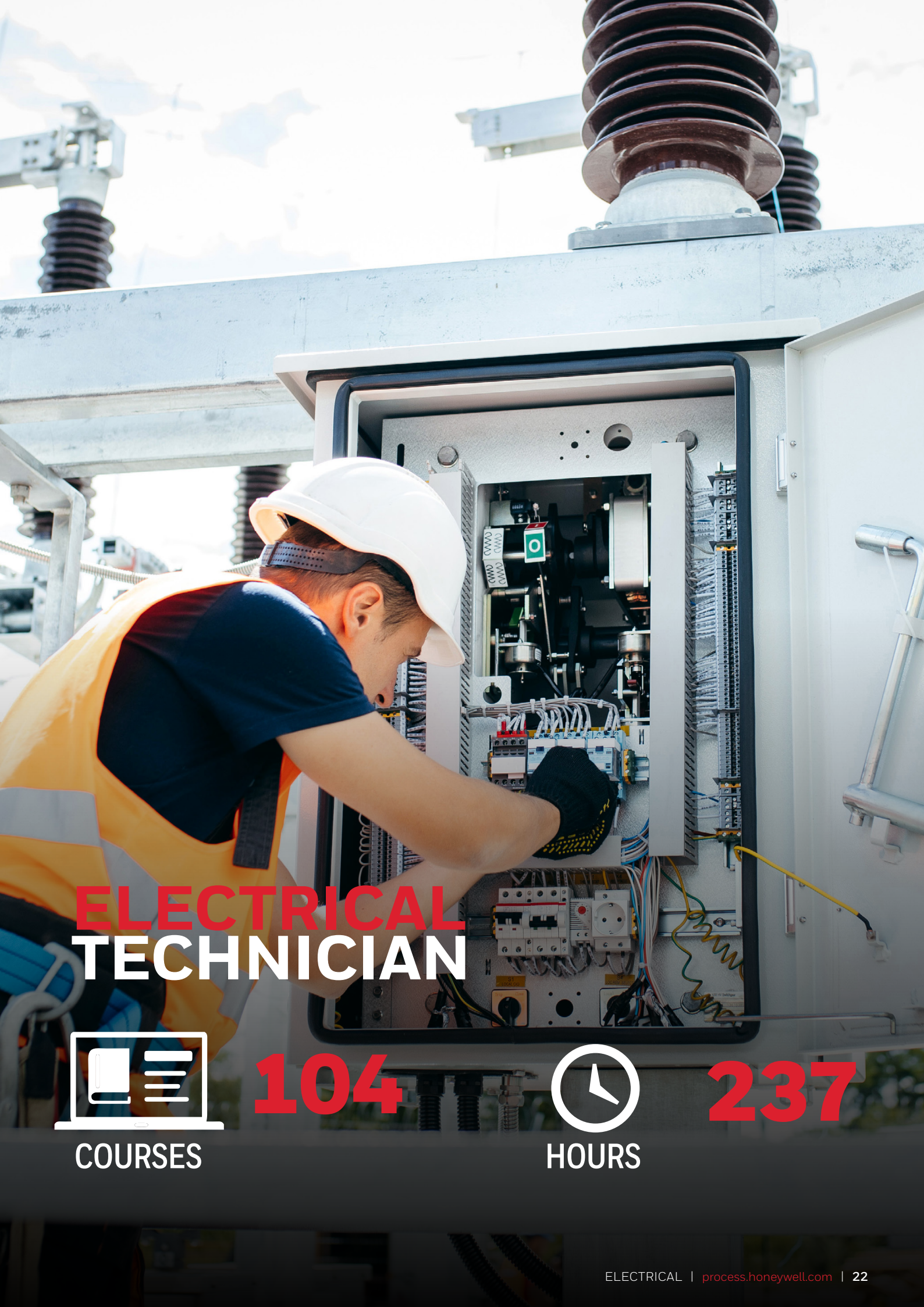
ROTATING & RECIPROCATING EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
CONDITION MONITORING			
PS-MNT-CMO-105	Condition Monitoring - Agitators and Mixers	In Condition Monitoring - Agitators and Mixes, you will learn about agitator and mixer detectable faults and common problems.	0.5
PS-MNT-CMO-102	Condition Monitoring - Compressors	In Condition Monitoring - Compressors, you will learn about centrifugal, axial, reciprocating, and screw compressor monitoring.	1
PS-MNT-CMO-103	Condition Monitoring - Pumps	In Condition Monitoring - Pumps, you will learn about centrifugal and positive displacement pump detectable faults and allowable vibration.	1
PS-MNT-CMO-104	Condition Monitoring - Turbines, Fans and Blowers	In Condition Monitoring - Turbines, Fans and Blowers, you will learn about turbine diagnostics, critical speeds, and vibration limits; common problems with fans and blowers.	1
PS-MNT-RED-101	Rotating Equipment Condition Diagnosis	In Rotating Equipment Condition Diagnosis, you will learn about vibration theory, including harmonic motion, RMS vs. peak, time and frequency domain; FFT algorithms, frequency spans, spectrum, and measurement basics; accelerometers; vibration due to imbalance, misalignment, or looseness; gear problems; bearing failures; peak-vue analysis; severity charts and standards; oil analysis; and selecting measurement parameters to determine optimum maintenance intervals.	5
FANS AND BLOWERS			
PS-MNT-FBL-101	Fans and Blowers	In Fans and Blowers, you will learn about centrifugal, cross-flow, and axial flow fans, mechanical draft, positive displacement, and dynamic blowers; fan and blower system characteristics, and fan efficiency.	3
PS-MNT-FBL-102	Fans and Blowers Maintenance	In Fans and Blowers Maintenance, you will learn about performing routine and extended maintenance on fans and blowers, including belt, bearing, fan, motor, and other component inspections; fan and blower installation and removal; and assessment and troubleshooting.	2

UTILITY, SAFETY AND FACILITY SYSTEMS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
COMPRESSED AIR SYSTEMS			
PS-MNT-AIR-102	Compressed Air Dryers	In this course, you will learn the purpose and operational theory behind the more common types of air dryers including regenerative, absorption, refrigeration and mechanical dryers, and how they fit into a compressed air system.	1
PS-MNT-PNE-101	Pneumatic Systems	In Pneumatic Systems, you will learn about pneumatic system components, common pneumatic valves; working safely with pneumatic systems; schematics and troubleshooting; and removing and installing components.	2
PS-MNT-AIR-101	Utility and Instrument Air Systems	In Utility and Instrument Air Systems, you will learn about compressed air systems, components, piping configuration, methods of moisture removal, and the hazards and risks associated with them.	1.5
FIRE AND GAS SYSTEMS			
PS-EIA-FDE-101	Fire Detection	In Fire Detection, you will learn about fire detection systems, including heat, smoke, and flame detectors; hydrocarbon emissions, UV/IR sensors and how to calibrate and troubleshoot these systems.	2
PS-MNT-FPS-101	Fire Protection Systems	In Fire Protection Systems, you will learn how about fire protection system components, fire pump types, operation, and maintenance; gas detector system types and sensors; Fire/gas detection system types, control, and operation; fire/gas protection systems, extinguishers, and maintenance, and fire/gas panels and maintenance.	6
PS-EIA-FSD-101	Flame Scanning Devices	In Principles of Flame Scanning Devices, you will learn about flame scanning devices, features, and how they operate; calibration, false alarms, proper installation and detection range, the square law, and testing; and maintaining and troubleshooting fire eye flame scanners.	2
PS-EIA-GDE-101	Gas Detection	In Gas Detection, you will learn about gas terminology, combustible gas detection, sensor types and features; detector and sensor calibration and troubleshooting.	1.5
GENERATOR AND EMERGENCY POWER SYSTEMS			
PS-MNT-DEG-101	Diesel Engine Generators	In Diesel Engine Generator, you will learn about how diesel engine generators work; their main components, including cooling, exhaust, and lubricating systems, engine, battery charger, control panel and main assembly frame; and how to maintain and inspect diesel engines, including general maintenance checks, procedures, and troubleshooting.	2
PS-MNT-EMB-101	Emergency Backup	In Emergency Backup, you will learn about emergency power systems, emergency and diesel generator power, critical and essential loads, uninterruptible power supplies (UPS), and standby generator maintenance.	1.5
PS-EIA-EPS-101	Emergency Power Systems	In this course, you will learn about emergency power systems and how they compare to standby power systems including power requirements according to international standards; the typical emergency backup system, configuration, and components; and the different types of UPS systems.	1
HVAC SYSTEM			
PS-MNT-HVC-101	HVAC Fundamentals	In HVAC Fundamentals, you will learn about the fundamentals of heating, ventilation and air conditioning systems including the types of heat transfer, HVAC system components, HVAC system operation, and the vapor compression and refrigeration cycle.	1
PS-MNT-HVC-102	Maintaining HVAC Systems	In Maintaining HVAC Systems, you will learn about the vapor compression cycle, HVAC components, window and package air conditioning unit maintenance; common mechanical faults and component malfunction troubleshooting..	4
HYDRAULIC SYSTEMS			
PS-MNT-HYD-101	Hydraulic Systems	In Hydraulic Systems, you will learn about hydraulic principles, pressure and flow, hydraulic components; controlling direction, speed, and pressure; hydraulic safety; nitrogen accumulators, maintaining hydraulic systems, storage and handling; hydraulic symbols and schematics, and troubleshooting.	4

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PLANT COMMUNICATION SYSTEMS			
A1192	Plant Radio Communication	In Plant Radio Communication, you will learn how to operate plant radio equipment to communicate effectively and according to FCC rules.	1
PS-MNT-RCS-101	Radio and Communication Systems	In Radio and Communication Systems, you will learn about wired communication systems; intercom and public address systems and maintenance; conventional radio systems, including scanning, simplex and duplex channels, trunked systems, and radio system equipment; paging systems; TETRA radio systems; and closed	5
SECURITY SYSTEMS			
PS-MNT-SSY-101	Security Systems	In Security Systems, you will learn about various security systems, sensor types, control methods; hydraulic bollard systems and road blockers, including construction and maintenance; rising arm and sliding gate barriers; turnstiles, card readers and access control; SabreFonic and microwave fence detection systems and repair and maintenance.	5



ELECTRICAL TECHNICIAN



COURSES

104



HOURS

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ELECTRICITY AND ELECTRICAL EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
DRAWINGS AND DIAGRAMS			
A1186	Electrical System Basics and Diagrams	In Electrical System Basics, you will learn about electrical generation and transmission, system voltages, and building schematic diagrams; Single line drawings, electrical symbols, and logic symbols and gates; and low and medium voltage motor drives and drive circuits.	3
ELECTRICAL AND COMMUNICATION CABLES			
PS-EIA-CDB-101	Cable Duct Banks and Trays	In Cable Duct Banks and Trays, you will learn about types of duct banks, cable tray configurations, cable tray applications, proper loading and support, wiring fill and space requirements, securing cables, and proper grounding and bonding.	1
PS-EIA-CAB-101	Electrical Cables	In Electrical Cables, you will learn about the function of electrical conductors, characteristics of conductor materials, conductor construction, wiring size and rating, insulation materials, and grounding.	1
PS-EIA-PCB-101	Power Cables	In Power Cables, you will learn about the different types of power cables, wire characteristics, properties, and sizes; insulation, cable glands, cabling systems and installations; power cable maintenance, repair, troubleshooting, and testing.	3
ELECTRICAL FUNDAMENTALS			
PS-EIA-BED-101	Basic Electronics	In Basic Electronics, you will learn about basic electricity; basic electronics, including voltage, ground, current, resistors, capacitors, and inductors; electrical circuits, including Ohm's and Kirchhoff's Laws; current, voltage, and power; series and parallel DC circuits, transistors and capacitors.	1.5
PS-EIA-EDO-101	Electrical Documentation	In Electrical Documentation, you will learn about types of electrical documentation, electrical loop numbers and symbols; power distribution and cable layout diagrams; control/schematic diagrams; protection and hazardous area diagrams; updating, storing, and controlling diagrams.	1.5
A1620	Electrical Fundamentals	The first section of Electrical Fundamentals describes units of electrical measurement, states Ohm's law and shows some of its uses, and describes and shows differences between series and parallel circuits. This section also shows some of the effects of resistance in series and parallel circuits, the use of resistance as voltage dividers, and ways to produce and make use of voltage drop. Next, the program describes how a magnetic field is produced and how magnetic fields are used in motors, measuring devices, and as resistors in electrical circuits and devices. You will also learn about the effects produced by alternating current, which describes alternating current, voltage and current phases, self-inductance, inductive reactance, the use of capacitors in AC circuits, and the use of induction coils as transformers. The program concludes with basic electronics, which briefly describes diodes and transistors and shows how they are used to rectify current and amplify electrical signals. This section also introduces simple transistor circuits and describes the use of capacitors in such circuits.	4
PS-EIA-GRD-101	Grounding	In Grounding, you will learn about different types of grounding systems, equipment and static grounding, lightning protection, bonding techniques, electronic system and substation grounding; ground fault monitoring, inspecting grounding and bonding systems; and tracing ground faults.	3
A1185	Understanding Electricity	In Understanding Electricity, you will learn how to safely work with electricity. You will learn about basic electrical terms, the effect of electric current on the human body, and why electricity is a potential hazard. Additionally, you will learn about grounding electrical equipment, the proper precautions you must take when working with electrical equipment, and how to act in an emergency. The Electric Power Distribution System section describes how electric power is distributed from a generating plant to a lease. Finally, you will learn about measuring electric usage, including units of measurement and how to read a meter.	4
MOTORS			
PS-MNT-CMO-101	Condition Monitoring - Electrical Motors	In Condition Monitoring - Electrical Motors, you will learn about induction and DC motor related problems including SCR problems, DC Comparator cards, and vibration analysis.	1
PS-EIA-EMO-101	Electrical Motor Properties, Troubleshooting and Maintenance	In Electrical Motor Properties, Troubleshooting and Maintenance, you will learn about common properties; voltage selection factors, insulation and thermal properties, enclosures and bearings; routine and preventive maintenance, and troubleshooting.	5
PS-EIA-EMO-102	Introduction to AC/DC Electrical Motors for Technicians	In Introduction to AC/DC Electrical Motors, you will learn about magnetism, producing alternating current, rotating magnetic fields, types of AC motors and AC motor properties; DC motor types and operation.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-MSA-101	Motor Signature Analysis (MCE)	In Motor Signature Analysis (MCE), you will learn about MCE functionality and detectable faults; test data analysis information, such as resistance-to-ground, setting warning levels, DC assets, RTG readings interpretation, capacitance-to-ground, phase-to-phase resistance and inductance, test lead check, resistive and inductive imbalance, average inductance, polarization index test, PI and DA data interpretation, rotor position an aliasing, data interpretation, and DC bar-to-bar test; and MCE troubleshooting.	3
PS-MNT-VFD-101	Variable Speed and Frequency Drives (VFD/VSD)	In Variable Speed and Frequency Drives, you will learn about the advantages of VFD & VSDs, AC drives and motor selection, DC drives, shunt connected motors, field saturation, operator control and control signals; typical problems and maintenance; SMART troubleshooting procedures and tests.	2.5
POWER SYSTEMS			
PS-EIA-BAT-101	Batteries	In Batteries, you will learn about battery components, types of cells, series and parallel connections, battery capacity and ratings, lead acid and Ni-Cad batteries; battery system performance; failure analysis and dual battery backup systems, system testing methods; preventive maintenance and safety concerns; and failure modes and system troubleshooting.	5
PS-EIA-CPB-101	Capacitor Banks	In Capacitor Banks, you will learn about capacitor theory, including capacitive reactance, power triangle, and power factor correction; harmonic distortion, resonance, and filters; power factor correction capacitor (PFCC) degradation; and capacitor bank maintenance and troubleshooting.	2
PS-EIA-PDT-101	Power and Distribution Transformers	In Power and Distribution Transformers, you will learn about basic transformer operation, types, components, connections, and operational parameters; transformer cooling; schematic symbols; and maintaining and troubleshooting low-, medium-, and high-voltage power transformers.	2
PS-EIA-PDT-102	Transformer Maintenance	In Maintenance for Power and Distribution Transformers, you will learn about maintaining and troubleshooting low-, medium-, and high-voltage power transformers.	1.5
PS-EIA-UPS-101	Uninterruptible Power Supply	In Uninterruptible Power Supply, you will learn about emergency and standby power systems, emergency power requirements, critical and essential load; UPS types and operation; DC UPS, UPS batteries, battery ratings and failures; maintenance and functional load testing; and UPS troubleshooting.	3
SWITCHGEAR			
PS-EIA-ARC-101	Arc Flash Causes and Mitigation	In Arc Flash, you will learn about arc flashes associated with electrical faults, personal protective equipment used to protect workers from arc flashes, and different switchgear including vacuum, air, gas and oil circuit breakers used to minimize the damage caused by contact arcing.	2
PS-EIA-CBR-101	Circuit Breakers	In Circuit Breakers, you will learn the basics of overcurrent protection, types of fuses and voltage level classifications; different types of circuit breakers, their rating and operation; and maintaining, monitoring, inspecting, and troubleshooting low voltage air and medium voltage vacuum power circuit breakers.	4
PS-EIA-GHS-101	Gas Insulated Substations (GIS) and Sulfur Hexafluoride (SF6)	In Gas Insulated Substations (GIS) and Sulfur Hexafluoride (SF6), you will learn about GIS, sulfur hexafluoride (SF6) properties, testing metrics, proper handling of faulted and non-faulted SF6; leak detection methods, and recordkeeping.	2.5
PS-EIA-GIS-101	High Voltage Gas Insulated Switchgear (GIS)	In High Voltage Gas Insulated Switchgear (GIS), you will learn about high voltage circuit switchers, circuit switcher construction, operating principles, safety, preventive maintenance; SF6 properties and handling; PPE and safety equipment, typical failures, and troubleshooting.	2
PS-EIA-HSS-101	High Voltage Substation Switchgear	In High Voltage Substation Switchgear, you will learn about substation switchgear and circuit breaker control, types of HV circuit breakers, HV relay protection, switchgear classification and operation, switchgear maintenance, handling SF6, and troubleshooting HV switchgear.	2
PS-EIA-LAR-101	Lightning Arrester	In Lightning Arresters, you will learn about lightning surges and strikes; lightning protection and arresters, including classes and types of lightning arresters; grounding and installation guidelines; basic safety precautions; and lightning arrester troubleshooting.	3
PS-EIA-LVS-101	Low Voltage Substation Switchgear	In Low Voltage Substation Switchgear, you will learn about switchgear terminology and construction, including indoor and outdoor switchgear, bus bars, metering, circuit breakers, and wiring; switchgear operation, preventive maintenance, typical failures, and general guidelines for troubleshooting.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-EIA-LVI-101	LV Intelligent Switchgear	In LV Intelligent Switchgear, you will learn about low voltage intelligent switchgear components, monitoring functions and preventive maintenance; MCU parameterization, failure codes, and terms and abbreviations; LV switchgear and communications troubleshooting.	3
PS-EIA-MVS-101	Medium Voltage Substation Switchgear	In Medium Voltage Substation Switchgear, you will learn about types of switchgear and typical layouts, medium voltage operation, component functions, maintenance, and troubleshooting.	3
PS-EIA-MVV-101	Medium Voltage Vacuum Contactors	In Medium Voltage Vacuum Contactors, you will learn about types of switches, disconnectors, contactors, circuit breakers, vacuum contactors and principles of operation; preventive maintenance and integrity testing; and basic troubleshooting guidelines.	2
PS-EIA-PRE-101	Protective Relays	In Protective Relays, you will learn about electrical system problems, types of protective relays, sensing equipment, transformers, relay numerical function types, protection schemes and strategies; zones of protection and feeder circuits; setting and adjusting protective relays, and troubleshooting electromechanical and electronic protective relay systems.	3

GENERAL KNOWLEDGE AND SKILLS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BEST PRACTICES			
A1137	Performing Skills Assessment	A performance assessment is a tool that is used to measure, maintain, and improve the behaviors associated with completing a task. Within a process facility, it is imperative that tasks be completed in a safe manner. Safety procedures specify how employees must complete each task within a process facility. In this program, you will learn how to assess job performance to ensure that each employee performs their assigned tasks in a safe manner.	1
PS-MNT-RAC-101	Reports and Communication	In Reports and Communication, you will learn about giving oral reports, including preparation, delivery, visual aids, and handouts; how to structure technical reports; and how to update and mark up diagrams and schematics.	1
DRAWINGS AND DIAGRAMS			
PS-MNT-ENG-101	Engineering Drawings and Symbols	In Engineering Drawings and Symbols, you will learn about the different types of engineering drawings, different drawing formats used in creating engineering drawings, the different areas of the drawing, the types of symbols used.	0.5
GENERAL OPERATIONS KNOWLEDGE			
PS-EIA-EFA-101	EI&A Field Awareness	In EI&A Field Awareness, you will learn about electrical power systems, emergency power systems, AC and DC UPS; cathodic protection, heat tracing, lighting and grounding systems; types of instrumentation systems; types of analyzer systems, and hazard awareness.	4
PS-EIA-HAP-101	Hazardous Area and Protection Classifications	In Hazardous Area and Protection Classifications, you will learn about hazardous areas, the combustion triangle, determining area classifications; IEC and NA protection classifications; and IP and NEMA equipment protection codes.	2
HAND TOOLS AND EQUIPMENT			
PS-EIA-TTF-101	Electrician's Tools and Test Equipment	In Electrician's Tools and Test Equipment, you will learn about types of electrician's tools; electrical test equipment, including analog and digital multimeters, ammeters, circuit tracers, insulation testers, phase and motor rotation meters, power analyzers, wire sorters, and other test equipment; instrumentation and calibration.	4
PS-MNT-HTM-101	Hand and Power Tools for Technicians	In Hand and Power Technicians, you will learn about hand tools, cutting tools and power tools; and how to select, use and maintain them safely and efficiently.	3.5
A1208	Working with Power Tools	Maintenance activities usually involve the use of some tools. Each of these tools is designed to perform a specific job. You must be able to select and operate the correct power tool for a particular job. In this program, you will learn the purpose, function and proper orientation of power tools. You will learn specific requirements of each type of power tool and how to use them safely.	2

GENERAL MAINTENANCE SKILLS AND KNOWLEDGE

COURSE #	COURSE TITLE	DESCRIPTION	HRS
CORROSION CONTROL			
PS-MNT-CPS-101	Cathodic Protection Systems	In Cathodic Protection Systems, you will learn about using cathodic protection to control metal surface corrosion, including: galvanic protection and anodes, impressed current and rectifier systems; cathodic protection surveys, inspection, testing, and record-keeping; and cathodic system safety, maintenance, and troubleshooting.	3
A1122	Corrosion Control	This program will teach you the basics of the corrosion process, the methods used to monitor the rate of corrosion and the control techniques used to protect equipment. By successfully controlling corrosion, the destructive effects can be minimized, and facility operations can be more profitable.	4
PS-MNT-COR-101	Corrosion in Metal	In Introduction to Corrosion, you will learn about the corrosion process, including metal corrosion, corrosion damage, and corrosion cells; and corrosion control, including cathodic protection, protective coatings, corrosion monitoring and measurement, and corrosion monitoring techniques.	3
DRAWINGS AND DIAGRAMS			
PS-MNT-MND-101	Manuals and Drawings	In Manuals and Drawings, you will learn about maintenance drawings, orthographic, process flow, piping and instrumentation, and schematic drawings; reading drawings and blueprints; standards organizations; and operations and maintenance manuals.	2
FILTERS			
PS-MNT-DCF-101	Dust and Coalescer Filters	In Dust and Coalescer Filters, you will learn about the application and workings of coalescing filters, the purpose of dust filters, and how to safely remove and install filter elements.	1
PS-MNT-FTS-101	Filters and Strainers	In Filters and Strainers, you will learn about filtration, filter media, and operation; mechanical, absorbent, and adsorbent filters; Y-basket and temporary (geometric) strainers; filter and strainer cleaning and maintenance.	2
GENERAL MAINTENANCE CONCEPTS			
PS-MNT-CMB-101	Condition Monitoring - Balancing	In Condition Monitoring - Balancing, you will learn balance quality grades and standards, calculating imbalance, vibration; in-place and single plane balancing, the four-step balancing method and balancing in one run; field balancing, and balancing in two planes.	2.5
PS-MNT-CMG-101	Condition Monitoring - General	In Condition Monitoring - General, you will learn about life, preventive, reactive, and predictive maintenance; potential fault analysis (PFA); vibration analysis, including imbalance, misalignment, and looseness analysis; and maintenance and maintainability data.	3
PS-MNT-FDT-101	Fault Diagnosis, Troubleshooting and Machine Inspections	In Fault Diagnosis, Troubleshooting and Machine Inspections, you will learn about common techniques of diagnosing and troubleshooting machine failures including Fault Tree Analysis (FTA) and Failure Mode and Effects Analysis (FEMA), machine performance monitoring, troubleshooting techniques using operation records, vibration analysis, and lubricating oil analysis and the non-destructive testing (NDT) methods of visual inspection, liquid penetrant, magnetic particle, ultrasonic, radiography and eddy current.	1.5
PS-MNT-CPM-101	Fundamentals of Condition and Predictive Monitoring	In Fundamentals of Condition and Predictive Monitoring, you will learn about the many different ways of monitoring the mechanical condition of equipment including vibration analysis, oil and wear debris analysis, ultrasonics, and infrared thermography.	1
PS-MNT-ITP-101	Insulation and Thermal Protection	In Insulation and Thermal Protection, you will learn about the purpose, types and applications of insulation and thermal protection.	0.5
PS-MNT-MFD-101	Maintenance Fundamentals	In Maintenance Fundamentals, you will learn about the principles and types of maintenance, including proactive, preventative, corrective, breakdown, and turnaround maintenance; and maintenance workflow planning and strategies.	1
PS-MNT-PCB-101	Planned, Corrective, and Breakdown Maintenance	In Planned, Corrective, and Breakdown Maintenance, you will learn planned, corrective, and breakdown maintenance, including planning, implementing, and executing maintenance schedules.	1.5
PS-MNT-PMP-101	Preventative Maintenance Plans	In Preventative Maintenance Plans, you will learn about the basic steps involved with the development of a preventive maintenance plan as well as the benefits of such a plan including: benefits, purpose, the Development process and principles of the program.	0.5

INSTRUMENTATION AND CONTROL

COURSE #	COURSE TITLE	DESCRIPTION	HRS
CONTROL SYSTEMS			
PS-EIA-CSN-101	Control Systems - SCADA, DCS and ESD	In Control Systems - SCADA, DCS and ESD, you will learn about control systems and basic feedback control; distributed control systems (DCS), including field I/O, process controllers, communications, redundancy, and operations; supervisory control and data acquisition (SCADA) systems, including field I/O, master and remote stations, along with their associated software components; and Emergency Shutdown Systems (ESD).	2
PS-EIA-SIC-101	Safety in Instrumentation and Control Systems	In Safety in Instrumentation and Control Systems, you will learn about emergency shutdown systems, standards, safety system technologies, SIS architecture; system integrity levels (SIL), equipment failure modes and analysis, SIS factors, and procedures for overriding ESD and SIL systems.	3
ELECTRICAL MEASUREMENT			
PS-EIA-ELM-101	Electrical Level Measurement	In Electrical Level Measurement, you will learn about resistance, conductance, and capacitance level measurement; capacitance level probes, and calibrating and troubleshooting electrical level measurements.	1

MATH AND SCIENCE FUNDAMENTALS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BASICS OF MATHEMATICS			
A1130	Process Plant Mathematics	In Process Plant Mathematics, you will learn about the principles and operations involving mathematics within a process facility, including addition, subtraction, multiplication, and division of fractions and decimals. You will also learn about using percentages, ratios, proportions, and triangles to solve problems involving process plant activities, such as mixing liquids, determining actual amounts in storage, and angle fitting.	5
A1181	Hydrocarbon Chemistry 101	In Hydrocarbon Chemistry 101, you will learn about basic hydrocarbon composition and properties; carbon and hydrocarbon bonding; hydrocarbon structures and types of formulas. You will also learn about alkanes/paraffins, saturation, alkenes/olefins, alkynes/acetylenes, structural (constitutional) isomers and stereoisomers; and saturated and unsaturated ring hydrocarbons. Finally, you will learn about hydrocarbon nomenclature: naming conventions, how isomers and ring hydrocarbons are named, IUPAC naming rules, and nomenclature for other organic compounds.	3
BASICS OF HYDROCARBON CHEMISTRY			
A1180	Process Plant Chemistry	In this program, you will learn about the basic chemistry behind the refining process. You will learn basic chemical terminology, molecular formulas, structural formulas, some common chemical symbols, and the various hydrocarbon groups used within the petrochemical industry. This program is designed to provide a background in the chemical nature of the operator's job, work environment, and products of refining.	2

PETROLEUM INDUSTRY OVERVIEW

COURSE #	COURSE TITLE	DESCRIPTION	HRS
GAS PROCESSING			
PS-EPT-INO-114	Gas Processing Overview	In Gas Processing Overview, you will learn about saleable products recoverable from raw, produced gas; gas composition and contaminants; sales gas specifications; gas sweetening and dehydration; hydrocarbon liquid products and extraction processes, Nitrogen removal and helium recovery; NGL fractionation/stabilization; NGL product treating; and sulfur recovery and disposal.	3
INDUSTRY OVERVIEW			
PS-EPT-INO-101	Modern Oil and Gas Industry	In Modern Oil and Gas Industry, you will learn about the historical, geographical, and modern context of the petroleum industry; its organization, the petroleum value chain, and economic drivers.	2
MIDSTREAM INDUSTRY SEGMENT			
PS-EPT-INO-112	Overview of the Midstream Industry Segment	In Overview of the Midstream Industry segment, you will learn about the Petroleum Value Chain, the midstream segment, conventional and unconventional reservoirs, the crude oil and natural gas value chains and value chain investment trends; natural gas terminology, global energy demand and trade, gas production and contracts; and gas processing, including end use products, contaminants and sales gas specifications, gas conditioning, dehydration, hydrocarbon dewpoint control, NGL extraction and stability, and NGL product treating.	3
PETROCHEMICALS			
PS-EPT-INO-119	Introduction to Solvents	In Introduction to Solvents, you will learn about basic solvent chemistry, its purpose and selection. Solvent chemistry, including types of bonds, electronegativity, and polar bonds are covered. Polar (protic and aprotic) and non-polar types of solvents are explained, as well as what defines organic and inorganic solvents. Chemical and hydrocarbon solvent properties, are covered, such as viscosity, solubility, relative evaporation rate (RER), density, and surface tension, along with health, safety, and environmental considerations. Finally, you will learn about solvent applications, such as paints, sealants, cleaners, and polishes; drilling and metalworking fluids; water treatment; pesticides; concrete release fluids, and heat transfer fluids.	2
PS-EPT-INO-117	Steam Cracking	Steam cracking is the main production process for petrochemicals, including ethylene, propylene and butadiene. The process involves breaking long chain hydrocarbons into shorter chains. In "Steam Cracking", you will learn about types of steam crackers and the functions performed in key areas, including the furnace, quench, compression, and chilling and separation sections. You will also learn about the difference between conversion and selectivity and the factors that affect ethane selectivity.	1
PIPELINE SYSTEMS			
PS-EPT-INO-113	Pipelines and Storage Systems	In Pipelines and Storage Systems, you will learn about the different hydrocarbon transportation systems, advantages of pipelines, pipeline projects, pipeline construction and types of pipelines; pipeline system design and components; pipeline problems and protection; and pigging. In addition, you will learn about hydrocarbon storage systems for liquids and gases, including appropriate types of tank designs and use of depleted reservoirs and salt caverns.	2
REFINING			
PS-EPT-INO-115	Fundamentals of Refining	In Fundamentals of Refining, you will learn about the refining industry as part of the downstream petroleum value chain including characteristics of crude oil and the refining products made from it, refining economics, a typical refinery configuration with its process streams and units.	2
SURFACE PROCESSING			
PS-EPT-INO-111	Surface Processing of Produced Fluids	In Surface Processing of Produced Fluids, you will learn about the integrated production system, fluid separation, emulsion breaking, crude products, gas separation and natural gas processing, NGL usage, and natural gas conversion to LNG and GTL.	1

PROCESS SAFETY

COURSE #	COURSE TITLE	DESCRIPTION	HRS
EMERGENCY PLANNING & RESPONSE			
A1112	Fire Fighting: Extinguishing Agents	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Extinguishing Agents, you will learn about the use of water, foam, carbon dioxide, dry chemicals, halons, and dry powders for controlling or extinguishing fires and for protecting men and equipment. You will also learn about proper hose handling and how to use small and large handlines, monitors, and fixed spray systems.	4
A1111	Fire Fighting: Fuels and Combustion	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Fuels and Combustion, you will learn that fire is combustion requiring fuel, oxygen, and a source of ignition. You will also learn about the flammability of typical liquid and vapor fuels, the sources of oxygen, the sources of ignition, and the causes and effects of various kinds of explosions and detonations. Finally, you will learn the three ways of extinguishing fires—quenching, smothering, and starving—and the techniques of dispersing flammable vapors to keep them from igniting or re-igniting during a fire.	3
A1113	Fire Fighting: Portable Fire Extinguishers and Foams	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, you will learn about portable fire extinguishers, which are the first line of defense in many fire situations. This program covers how to select and operate them properly. You will also learn about the construction of CO2 and dry chemical extinguishers and how they are used for putting out small fires. Finally, you will learn about the use of foam for extinguishing large area flat fires, and how both chemical foams and air foams are prepared and applied.	4
A1114b	Fire Fighting: Strategies	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. Your ability to prevent a fire or react to a fire emergency may depend on how well you planned ahead for that particular situation. Planning ahead means that you have identified fire problem areas, developed the appropriate action plans, and prepared to fight a fire with the proper firefighting equipment, techniques and tactics. In this program, you will learn pre-fire planning and basic strategy. You will also learn strategies for fighting tank and dike fires. Finally, you will apply what you have learned in exercises that cover all different types of fires.	3
A1114a	Fire Fighting: Tactics	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. The way you attack a fire depends on several different factors, including how the fuel is burning and the location of the fire. It is important that you know and can implement the correct attack for any type of fire. In this program, you will learn the tactics of hose handling, of operating valves under fire exposure, of using dry chemical and foam, and of protecting pressure vessels.	3
SAFE WORK PRACTICES			
A1197	Job Hazard Analysis and Stop Work Authority	Working within the process industry can result in exceptionally high safety risks, and employers put programs in place to reduce the likelihood of accidents and injuries. Job Safety Analysis (JSA) and Stop Work Authority (SWA) require all employees to watch for safety risks and potential hazards. In this program, you will learn about JSAs and SWA and how you can help implement both.	1
A1170	Safe Handling of Light Ends	In this program, you will learn the physical properties of gaseous hydrocarbons that create hazards, and the special handling and safety procedures that are required.	3

PRODUCTION OPERATIONS			
COURSE #	COURSE TITLE	DESCRIPTION	HRS
PROCESS SAFETY MANAGEMENT			
A1638	SEMS Standard and Requirements	In SEMS Standards and Requirements, you will learn about the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety Environmental Enforcement (BSEE) regulations established in 30 CFR, 250, Subpart S.	1
PSST (T2)			
A1639	Reducing Marine Trash and Debris	Reducing Marine Trash and Debris is designed to help you meet the training requirements of 30 CFR 250.300 (a) and (b)(6). It covers information related to marine trash and debris in offshore environments, including how to report pollution, and how to prevent it.	1
A1632	Well Control and Production Safety Regulations	In this third program in the series, operators will learn about regulatory requirements governing well control and production safety duties specified in 30 CFR 250, including pollution prevention requirements, well completion requirements, and oil and gas drilling requirements. This program is designed for Mechanics and Electricians, "B" Operators, Instrument and Electrical Technicians, "A" Operators, Senior (Lead) Operators, Production Foremen and/or other positions.	3

REFINERY OPERATIONS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
TURNAROUND			
PS-REF-TUR-101	Turnaround Operations	During process operations, equipment becomes less flexible and increasingly unable to reach maximum production capacity because operating conditions deteriorate. To keep conditions optimal for production, process facilities schedule turnaround (T/A) operations to restore unit operating capabilities. In this series, you will learn about T/A operations, how they are implemented, and the overall impact a turnaround operation has on facility costs.	5

ROTATING & RECIPROCATING EQUIPMENT

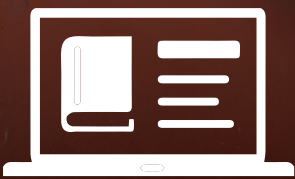
COURSE #	COURSE TITLE	DESCRIPTION	HRS
CONDITION MONITORING			
PS-MNT-CMO-105	Condition Monitoring - Agitators and Mixers	In Condition Monitoring - Agitators and Mixes, you will learn about agitator and mixer detectable faults and common problems.	0.5
PS-MNT-CMO-102	Condition Monitoring - Compressors	In Condition Monitoring - Compressors, you will learn about centrifugal, axial, reciprocating, and screw compressor monitoring.	1
PS-MNT-CMO-103	Condition Monitoring - Pumps	In Condition Monitoring - Pumps, you will learn about centrifugal and positive displacement pump detectable faults and allowable vibration.	1
PS-MNT-CMO-104	Condition Monitoring - Turbines, Fans and Blowers	In Condition Monitoring - Turbines, Fans and Blowers, you will learn about turbine diagnostics, critical speeds, and vibration limits; common problems with fans and blowers.	1
PS-MNT-RED-101	Rotating Equipment Condition Diagnosis	In Rotating Equipment Condition Diagnosis, you will learn about vibration theory, including harmonic motion, RMS vs. peak, time and frequency domain; FFT algorithms, frequency spans, spectrum, and measurement basics; accelerometers; vibration due to imbalance, misalignment, or looseness; gear problems; bearing failures; peak-vue analysis; severity charts and standards; oil analysis; and selecting measurement parameters to determine optimum maintenance intervals.	5
FANS AND BLOWERS			
PS-MNT-FBL-101	Fans and Blowers	In Fans and Blowers, you will learn about centrifugal, cross-flow, and axial flow fans, mechanical draft, positive displacement, and dynamic blowers; fan and blower system characteristics, and fan efficiency.	3
PS-MNT-FBL-102	Fans and Blowers Maintenance	In Fans and Blowers Maintenance, you will learn about performing routine and extended maintenance on fans and blowers, including belt, bearing, fan, motor, and other component inspections; fan and blower installation and removal; and assessment and troubleshooting.	2

UTILITY, SAFETY AND FACILITY SYSTEMS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
FIRE AND GAS SYSTEMS			
PS-EIA-FDE-101	Fire Detection	In Fire Detection, you will learn about fire detection systems, including heat, smoke, and flame detectors; hydrocarbon emissions, UV/IR sensors and how to calibrate and troubleshoot these systems.	2
PS-MNT-FPS-101	Fire Protection Systems	In Fire Protection Systems, you will learn how about fire protection system components, fire pump types, operation, and maintenance; gas detector system types and sensors; Fire/gas detection system types, control, and operation; fire/gas protection systems, extinguishers, and maintenance, and fire/gas panels and maintenance.	6
PS-EIA-GDE-101	Gas Detection	In Gas Detection, you will learn about gas terminology, combustible gas detection, sensor types and features; detector and sensor calibration and troubleshooting.	1.5
GENERATOR AND EMERGENCY POWER SYSTEMS			
PS-MNT-DEG-101	Diesel Engine Generators	In Diesel Engine Generator, you will learn about how diesel engine generators work; their main components, including cooling, exhaust, and lubricating systems, engine, battery charger, control panel and main assembly frame; and how to maintain and inspect diesel engines, including general maintenance checks, procedures, and troubleshooting.	2
PS-MNT-EMB-101	Emergency Backup	In Emergency Backup, you will learn about emergency power systems, emergency and diesel generator power, critical and essential loads, uninterruptible power supplies (UPS), and standby generator maintenance.	1.5
PS-EIA-EPS-101	Emergency Power Systems	In this course, you will learn about emergency power systems and how they compare to standby power systems including power requirements according to international standards; the typical emergency backup system, configuration, and components; and the different types of UPS systems.	1
HEAT TRACING			
PS-MNT-EHT-101	Electrical Heat Tracing	In Electrical Heat Tracing, you will learn about electrical heat tracing advantages and disadvantages; types of heat tracing, including steam tracing, mineral and silicone insulated, constant wattage, power-limiting, SECT, self-regulating polymer, induction heating, and blanket electric heaters; heat tracing applications and precautions; installation and monitoring; maintenance and troubleshooting.	4
HVAC SYSTEM			
PS-MNT-HVC-101	HVAC Fundamentals	In HVAC Fundamentals, you will learn about the fundamentals of heating, ventilation and air conditioning systems including the types of heat transfer, HVAC system components, HVAC system operation, and the vapor compression and refrigeration cycle.	1
PS-MNT-HVC-102	Maintaining HVAC Systems	In Maintaining HVAC Systems, you will learn about the vapor compression cycle, HVAC components, window and package air conditioning unit maintenance; common mechanical faults and component malfunction troubleshooting.	4
PLANT COMMUNICATION SYSTEMS			
A1192	Plant Radio Communication	In Plant Radio Communication, you will learn how to operate plant radio equipment to communicate effectively and according to FCC rules.	1
PLANT LIGHTING			
PS-MNT-PLT-101	Plant Lighting	In Plant Lighting, you will learn about rated life and efficiency of plant lighting; equipment protection ratings; types of lighting, including incandescent, fluorescent, high intensity discharge and LED lamps, and lighting system maintenance.	2.5



MECHANICAL ROTATING EQUIPMENT TECHNICIAN



COURSES

160



HOURS

404

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ELECTRICITY AND ELECTRICAL EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
DRAWINGS AND DIAGRAMS			
A1186	Electrical System Basics and Diagrams	In Electrical System Basics, you will learn about electrical generation and transmission, system voltages, and building schematic diagrams; Single line drawings, electrical symbols, and logic symbols and gates; and low and medium voltage motor drives and drive circuits.	3
ELECTRICAL FUNDAMENTALS			
PS-EIA-EDO-101	Electrical Documentation	In Electrical Documentation, you will learn about types of electrical documentation, electrical loop numbers and symbols; power distribution and cable layout diagrams; control/schematic diagrams; protection and hazardous area diagrams; updating, storing, and controlling diagrams.	1.5
A1620	Electrical Fundamentals	The first section of Electrical Fundamentals describes units of electrical measurement, states Ohm's law and shows some of its uses, and describes and shows differences between series and parallel circuits. This section also shows some of the effects of resistance in series and parallel circuits, the use of resistance as voltage dividers, and ways to produce and make use of voltage drop. Next, the program describes how a magnetic field is produced and how magnetic fields are used in motors, measuring devices, and as resistors in electrical circuits and devices. You will also learn about the effects produced by alternating current, which describes alternating current, voltage and current phases, self-inductance, inductive reactance, the use of capacitors in AC circuits, and the use of induction coils as transformers. The program concludes with basic electronics, which briefly describes diodes and transistors and shows how they are used to rectify current and amplify electrical signals. This section also introduces simple transistor circuits and describes the use of capacitors in such circuits.	4
A1185	Understanding Electricity	In Understanding Electricity, you will learn how to safely work with electricity. You will learn about basic electrical terms, the effect of electric current on the human body, and why electricity is a potential hazard. Additionally, you will learn about grounding electrical equipment, the proper precautions you must take when working with electrical equipment, and how to act in an emergency. The Electric Power Distribution System section describes how electric power is distributed from a generating plant to a lease. Finally, you will learn about measuring electric usage, including units of measurement and how to read a meter.	4
MOTORS			
A1081	AC Motors for Operators	Designed for Operations Personnel, AC Motors describes how a motor changes the energy of electric current into mechanical power. This program describes how electric current produces magnetism and magnetism induces electric current. You will learn how motors are designed so that the attracting and repelling of magnetic fields sets up rotation of the shaft. Also covered is the starting and running characteristics of AC motors, and the speeds and horsepower of AC motors. The section on motor control describes starting and stopping mechanisms for AC motors, protective devices that may be found on motor controllers, and safety devices. You will learn proper procedures for starting, running, and stopping the motor. Finally, the program describes lubrication and maintenance procedures, and types of motor enclosures.	5
PS-MNT-VFD-101	Variable Speed and Frequency Drives (VFD/VSD)	In Variable Speed and Frequency Drives, you will learn about the advantages of VFD & VSDs, AC drives and motor selection, DC drives, shunt connected motors, field saturation, operator control and control signals; typical problems and maintenance; SMART troubleshooting procedures and tests.	2.5

GENERAL KNOWLEDGE AND SKILLS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BEST PRACTICES			
A1137	Performing Skills Assessment	A performance assessment is a tool that is used to measure, maintain, and improve the behaviors associated with completing a task. Within a process facility, it is imperative that tasks be completed in a safe manner. Safety procedures specify how employees must complete each task within a process facility. In this program, you will learn how to assess job performance to ensure that each employee performs their assigned tasks in a safe manner.	1
PS-MNT-RAC-101	Reports and Communication	In Reports and Communication, you will learn about giving oral reports, including preparation, delivery, visual aids, and handouts; how to structure technical reports; and how to update and mark up diagrams and schematics.	1
DRAWINGS AND DIAGRAMS			
PS-MNT-ENG-101	Engineering Drawings and Symbols	In Engineering Drawings and Symbols, you will learn about the different types of engineering drawings, different drawing formats used in creating engineering drawings, the different areas of the drawing, the types of symbols used.	0.5
GENERAL OPERATIONS KNOWLEDGE			
PS-EIA-EFA-101	EI&A Field Awareness	In EI&A Field Awareness, you will learn about electrical power systems, emergency power systems, AC and DC UPS; cathodic protection, heat tracing, lighting and grounding systems; types of instrumentation systems; types of analyzer systems, and hazard awareness.	4
PS-EIA-HAP-101	Hazardous Area and Protection Classifications	In Hazardous Area and Protection Classifications, you will learn about hazardous areas, the combustion triangle, determining area classifications; IEC and NA protection classifications; and IP and NEMA equipment protection codes.	2
HAND TOOLS AND EQUIPMENT			
PS-MNT-HTM-101	Hand and Power Tools for Technicians	In Hand and Power Technicians, you will learn about hand tools, cutting tools and power tools; and how to select, use and maintain them safely and efficiently.	3.5
PS-MNT-MEA-101	Measuring Tools	In Measuring Equipment, you will learn about general and precision measuring tools; and how to select, use and maintain them safely and efficiently.	1.5
A1208	Working with Power Tools	Maintenance activities usually involve the use of some tools. Each of these tools is designed to perform a specific job. You must be able to select and operate the correct power tool for a particular job. In this program, you will learn the purpose, function and proper orientation of power tools. You will learn specific requirements of each type of power tool and how to use them safely.	2
PS-MNT-WTE-101	Workshop Tools and Equipment	In Workshop Tools and Equipment, you will learn about the different parts and safe operation of hydraulic bench presses, drill presses, pedestal and angle grinders, band saws, sandblasters, and lathes.	2

GENERAL MAINTENANCE SKILLS AND KNOWLEDGE

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BEARINGS, SEALS AND FASTENERS			
PS-MNT-BEA-101	Bearings	In Bearings, you will learn about industrial applications, bearing classifications and specifications, common bearing configurations; installing, removing, and maintaining bearings, and problem troubleshooting.	2.5
PS-MNT-FAS-101	Fasteners	In Fasteners, you will learn about different types of fasteners, including wedge anchors, buckles, cable ties, clamps, clips, pins, retaining rings, rivets, screws, bolts, nuts, and washers; their classifications, specifications, and standards; inspection, maintenance, troubleshooting, handling, and storage.	4
PS-MNT-SDG-101	Gaskets and Packing	In Gaskets and Packing, you will learn about non-metallic, semi-metallic, and metallic gaskets; flange types and standards, tensile strength surface finish, and load sealability; packing types and materials; and gasket installation, inspection, storage, handling, and troubleshooting.	2.5
PS-MNT-SDG-101	Sealing Devices (Gaskets)	In Sealing Devices (Gaskets), you will learn about non-metallic, semi-metallic, and metallic gaskets; flange types and standards, tensile strength surface finish, and load sealability; and gasket installation, inspection, storage, handling, and troubleshooting.	2.5
CORROSION CONTROL			
A1122	Corrosion Control	This program will teach you the basics of the corrosion process, the methods used to monitor the rate of corrosion and the control techniques used to protect equipment. By successfully controlling corrosion, the destructive effects can be minimized, and facility operations can be more profitable.	4
PS-MNT-COR-101	Corrosion in Metal	In Introduction to Corrosion, you will learn about the corrosion process, including metal corrosion, corrosion damage, and corrosion cells; and corrosion control, including cathodic protection, protective coatings, corrosion monitoring and measurement, and corrosion monitoring techniques.	3
A1580	Oil Field Corrosion	Millions of dollars are lost each year to corrosion in the oilfield. Millions more are spent attempting to control it. This program will teach you the basics of the corrosion process, the methods used to monitor the rate of corrosion and the control techniques used to protect equipment. By successfully controlling corrosion, the destructive effects can be minimized, and the operation of the lease can be more profitable.	4
COUPLINGS AND GEARS			
PS-MNT-DRC-101	Drive Couplings	In Couplings, you will learn about drive couplings, including classification, rigid and flexible couplings; online and offline drive coupling maintenance, belt tensioning, coupling removal and installation, and troubleshooting.	3.5
PS-MNT-GEA-101	Gears	In Gears, you will learn about gear purpose, classifications, and applications; routine maintenance; gear installation and removal; gearbox maintenance, overhaul, and assembly; and gear troubleshooting.	4
DRAWINGS AND DIAGRAMS			
PS-MNT-MND-101	Manuals and Drawings	In Manuals and Drawings, you will learn about maintenance drawings, orthographic, process flow, piping and instrumentation, and schematic drawings; reading drawings and blueprints; standards organizations; and operations and maintenance manuals.	2
FILTERS			
PS-MNT-DCF-101	Dust and Coalescer Filters	In Dust and Coalescer Filters, you will learn about the application and workings of coalescing filters, the purpose of dust filters, and how to safely remove and install filter elements.	1
PS-MNT-FTS-101	Filters and Strainers	In Filters and Strainers, you will learn about filtration, filter media, and operation; mechanical, absorbent, and adsorbent filters; Y-basket and temporary (geometric) strainers; filter and strainer cleaning and maintenance.	2
GENERAL MAINTENANCE CONCEPTS			
PS-MNT-BLD-101	Blinding and De-blinding	In Blinding and Deblinding, you will learn about slip blinds, spectacle blinds, and blind flanges, blind and flange sizes, and blind installation and removal.	1
PS-MNT-CMB-101	Condition Monitoring - Balancing	In Condition Monitoring - Balancing, you will learn balance quality grades and standards, calculating imbalance, vibration; in-place and single plane balancing, the four-step balancing method and balancing in one run; field balancing, and balancing in two planes.	2.5
PS-MNT-CMG-101	Condition Monitoring - General	In Condition Monitoring - General, you will learn about life, preventive, reactive, and predictive maintenance; potential fault analysis (PFA); vibration analysis, including imbalance, misalignment, and looseness analysis; and maintenance and maintainability data.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PS-MNT-FDT-101	Fault Diagnosis, Troubleshooting and Machine Inspections	In Fault Diagnosis, Troubleshooting and Machine Inspections, you will learn about common techniques of diagnosing and troubleshooting machine failures including Fault Tree Analysis (FTA) and Failure Mode and Effects Analysis (FEMA), machine performance monitoring, troubleshooting techniques using operation records, vibration analysis, and lubricating oil analysis and the non-destructive testing (NDT) methods of visual inspection, liquid penetrant, magnetic particle, ultrasonic, radiography and eddy current.	1.5
PS-MNT-CPM-101	Fundamentals of Condition and Predictive Monitoring	In Fundamentals of Condition and Predictive Monitoring, you will learn about the many different ways of monitoring the mechanical condition of equipment including vibration analysis, oil and wear debris analysis, ultrasonics, and infrared thermography.	1
PS-MNT-ITP-101	Insulation and Thermal Protection	In Insulation and Thermal Protection, you will learn about the purpose, types and applications of insulation and thermal protection.	0.5
PS-MNT-MFD-101	Maintenance Fundamentals	In Maintenance Fundamentals, you will learn about the principles and types of maintenance, including proactive, preventative, corrective, breakdown, and turnaround maintenance; and maintenance workflow planning and strategies.	1
PS-MNT-PCB-101	Planned, Corrective, and Breakdown Maintenance	In Planned, Corrective, and Breakdown Maintenance, you will learn planned, corrective, and breakdown maintenance, including planning, implementing, and executing maintenance schedules.	1.5
PS-MNT-PMP-101	Preventative Maintenance Plans	In Preventative Maintenance Plans, you will learn about the basic steps involved with the development of a preventive maintenance plan as well as the benefits of such a plan including: benefits, purpose, the Development process and principles of the program.	0.5
LEAK DETECTION			
A1198	Leak Detection and Repair	In this program, you will learn about controlling hazardous emissions through leak detection and repair.	1
PS-MNT-LDR-101	Leak Detection in Refrigeration Lines	In this program, you will learn about different methods for detecting and repairing leaks in refrigerant lines	1
LUBRICATION			
A1210	Lubrication Concepts	To ensure proper operation, all machines must be lubricated. Metal parts must be separated from one another when in operation, or rapid wear and deterioration will result. This separation can be provided with oil lubricant. In this program, you will learn about the different lubricants and their qualities so that you can choose the proper lubricant for the equipment you operate.	1
PS-MNT-LCA-101	Lubrication Systems, Classifications and Applications	To ensure proper operation, all machines must be lubricated. In Lubrication Systems, Classifications and Applications, you will learn about frictional force, types of lubrication, lubricant properties, viscosity index and oxidation; lubricant classifications, and synthetic and specialized lubricants; types of lubrication systems; lubrication charts and inspection tasks; lubricant application and storage.	5
MACHINE ALIGNMENT			
PS-MNT-MAL-101	Machine Alignment	In Machine Alignment, you will learn about the purpose of alignment, parallel and angular misalignment, alignment method selection; and performing precision, non-precision, and laser alignment.	2
PIPES, HOSES AND FITTINGS			
A1205	Flange Piping	This program explains the use of flange piping and the procedures for connecting flanges. Major topics include types of fittings and flanges, flange gaskets, and blinding lines.	2
PS-MNT-MHS-101	Mechanical Hoses	In Mechanical Hoses, you will learn about utility hose elements and selection, handling, cleaning, and storing hoses, specialty hoses, hose inspection and RMA testing standards; grounding hoses, and hose troubleshooting.	3
A1202	Pipe Fitting Basics	This program covers the various pipes and fittings that make up a piping system and explains how to read piping diagrams. You will learn how pipe connections are made and how to select the proper equipment.	1
PS-MNT-PSU-101	Pipe Supports	In Pipe Supports, you will learn about rigid, dynamic, and spring type pipe supports and their applications; pipe support design and inspection points; inspection and testing, extended maintenance, and troubleshooting.	3
PS-MNT-PFI-101	Pipes and Fittings	In Pipes and Fittings, you will learn about pipe material, tubing, fittings, piping and instrumentation symbols, proper selection, and piping inspection and maintenance.	1
PS-MNT-PTF-101	Pneumatic Tubing and Fittings	In Pneumatic Tubing and Fittings, you will learn about pneumatic tubing applications, tubing types, how to select the proper tubing, types of pneumatic fittings, and tubing installation guidelines.	1

COURSE #	COURSE TITLE	DESCRIPTION	HRS
A1204	Small Threaded Pipe	This program covers applications for small threaded pipe and how to cut and thread piping joints. You will learn how to replace temperature and pressure indicators and how to operate pipe threading equipment.	2
A1203	Tubing	This program explains the various uses for tubing and how to make up a small tubing run. Major subjects include types of tubing and fittings, tubing applications, tube bending, and how to assemble and tighten tubing.	2

INSTRUMENTATION AND CONTROL

COURSE #	COURSE TITLE	DESCRIPTION	HRS
CONTROL SYSTEMS			
PS-EIA-CTL-101	Control Loops	In Control Loops, you will learn about control loops and controller action, including control types, controllers, variables, control modes; types of control schemes, including cascade, ratio, split range, feedforward, multivariable and adaptive control; and control loop tuning techniques.	3
PS-EIA-CSN-101	Control Systems - SCADA, DCS and ESD	In Control Systems - SCADA, DCS and ESD, you will learn about control systems and basic feedback control; distributed control systems (DCS), including field I/O, process controllers, communications, redundancy, and operations; supervisory control and data acquisition (SCADA) systems, including field I/O, master and remote stations, along with their associated software components; and Emergency Shutdown Systems (ESD).	2
PS-EIA-SIC-101	Safety in Instrumentation and Control Systems	In Safety in Instrumentation and Control Systems, you will learn about emergency shutdown systems, standards, safety system technologies, SIS architecture; system integrity levels (SIL), equipment failure modes and analysis, SIS factors, and procedures for overriding ESD and SIL systems.	3

MATH AND SCIENCE FUNDAMENTALS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
BASICS OF MATHEMATICS			
A1130	Process Plant Mathematics	In Process Plant Mathematics, you will learn about the principles and operations involving mathematics within a process facility, including addition, subtraction, multiplication, and division of fractions and decimals. You will also learn about using percentages, ratios, proportions, and triangles to solve problems involving process plant activities, such as mixing liquids, determining actual amounts in storage, and angle fitting.	5
A1181	Hydrocarbon Chemistry 101	In Hydrocarbon Chemistry 101, you will learn about basic hydrocarbon composition and properties; carbon and hydrocarbon bonding; hydrocarbon structures and types of formulas. You will also learn about alkanes/paraffins, saturation, alkenes/olefins, alkynes/acetylenes, structural (constitutional) isomers and stereoisomers; and saturated and unsaturated ring hydrocarbons. Finally, you will learn about hydrocarbon nomenclature: naming conventions, how isomers and ring hydrocarbons are named, IUPAC naming rules, and nomenclature for other organic compounds.	3
BASICS OF HYDROCARBON CHEMISTRY			
A1180	Process Plant Chemistry	In this program, you will learn about the basic chemistry behind the refining process. You will learn basic chemical terminology, molecular formulas, structural formulas, some common chemical symbols, and the various hydrocarbon groups used within the petrochemical industry. This program is designed to provide a background in the chemical nature of the operator's job, work environment, and products of refining.	2
PHYSICS OF FLUID AND FLOW			
A1610a	Fundamentals of Fluids for Production Operations: Fluid Behavior	In this program, you will learn about the types of fluids and their chemical and physical nature, the nature of phase, how phase change is used, and how it can be controlled. The program goes on to cover the instruments and units for measuring fluids. This includes units for measuring pressure, temperature, density, and viscosity. You will also learn about the nature of absolute measurements and how to convert measurements from one unit to another.	4
A1610b	Fundamentals of Fluids for Production Operations: Gases and Static Pressure	In this program, you will learn how to predict pressure, temperature, and volume changes that occur in gas compression and storage. You will also learn to recognize hazards in gas handling and the precautions used to avoid these hazards. This program also covers the nature, calculation, and uses of static pressure, including how to calculate pressure from liquid level and liquid level from bottom gauge pressure, the instruments that operate on the principle of static pressure, the nature and hazards of vacuum; and the uses of static pressure in handling and transporting fluids.	3
A1044	Mechanics of Fluids: Fluids in Motion	Hydrocarbon processing involves many types of fluids. Mechanics of Fluids is a series of five learning programs covering the principles of fluid handling in refineries and other process industries. The courses in this series include: Introduction to Mechanics of Fluids, Units of Measurement, Behavior of Gases, Statics, and Fluids in Motion. In this final program, Fluids in Motion, you will learn the factors affecting flow rate and how these can be controlled, the basic principles and instruments of flow measurement, and the control of rate through valves and through pumping.	4
A1041a	Mechanics of Fluids: Introduction to Process Fluids	Hydrocarbon processing involves many types of fluids. Mechanics of Fluids is a series of five learning programs covering the principles of fluid handling in refineries and other process industries. In Introduction to Process Fluids, you will learn about types of fluids and their chemical and physical nature, including gas compressibility and liquid incompressibility. You will learn about the nature of phase, how phase change is used, and how it can be controlled. You will also learn about the fluid distillation process, types of fluid systems and emulsions.	4
A1043	Mechanics of Fluids: Static Pressure and Head	Hydrocarbon processing involves many types of fluids. Mechanics of Fluids is a series of five learning programs covering the principles of fluid handling in refineries and other process industries. The courses in this series include: Introduction to Mechanics of Fluids, Units of Measurement, Behavior of Gases, Statics, and Fluids in Motion. In Static Pressure and Head, the fourth program in the Mechanics of Fluids Series, you will learn about the nature, calculation, and uses of static pressure. Topics include how to calculate pressure from liquid level, and how to calculate liquid level from bottom gauge pressure, the instruments that operate on the principle of static pressure, the nature and hazards of vacuum, and the uses of static pressure in handling and transporting fluids.	5

COURSE #	COURSE TITLE	DESCRIPTION	HRS
A1041b	Mechanics of Fluids: Units of Fluid Measurement	Hydrocarbon processing involves many types of fluids. Mechanics of Fluids is a series of five learning programs covering the principles of fluid handling in refineries and other process industries. The courses in this series include: Introduction to Mechanics of Fluids, Units of Measurement, Behavior of Gases, Statics, and Fluids in Motion. In Units of Fluid Measurement, you will learn about pressure measurements, temperature measurements, density and gravity measurements, and viscosity measurements. You'll also learn about the nature of absolute measurement and how to convert measurements from one unit to another.	4
A1042	Mechanics of Fluids: Behavior of Gases	Hydrocarbon processing involves many types of fluids. Mechanics of Fluids is a series of five learning programs covering the principles of fluid handling in refineries and other process industries. The courses in this series include: Introduction to Mechanics of Fluids, Units of Measurement, Behavior of Gases, Statics, and Fluids in Motion. In Behavior of Gases, the third program in the Mechanics of Fluids Series, you will learn how to predict the pressure, temperature, and volume changes that occur in the compression and storing of gases. You will also learn to recognize hazards in gas handling and the precautions used to avoid these hazards.	4
PHYSICS OF GASES & COMPRESSORS			
A1051	Introduction To Compression	In Introduction to Compression, you will learn about the construction and operation of gas compressors. You will learn about the basic laws of gas behavior and the units of gas measurement. You will learn the nature of compression, including the compression ratio, the heat effects of compression, and the factors affecting compressor horsepower requirements.	4

PETROCHEMICAL PROCESS EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
EXTRUDER			
PS-MNT-EXE-101	Extruder Equipment	In Extruder Equipment, you will learn about types of extruders, sections, components, and lubrication systems; safety and utilities; extruder operation, and building vacuum system.	1.5
PS-MNT-EXE-102	Extruder Equipment Maintenance	In Extruder Equipment Maintenance, you will learn about extruder maintenance, including dismantling and installing parts, inspection scheduling, and maintenance hazards; routine and extended maintenance checks, overhaul and replacement scheduling; and troubleshooting, including bearings and mixers.	4
HYPER COMPRESSOR			
PS-MNT-HYP-101	Hyper Compressor	In Hyper Compressor, you will learn about hyper compressor key components, including HP and LP packing assemblies, cylinder lubricating system, plunger and central valve; safety devices; lubricating and cooling systems; performing basic and extended maintenance; detecting damage and troubleshooting.	2.5
PELLET DRYER			
PS-MNT-GPD-101	Gala Pellet Dryer for Technicians	In Gala Pellet Dryers, you will learn about the pellet dryer process, lubrication, cleaning, inspection, and routine and extended maintenance, part replacement, and troubleshooting.	2.5
PELLETIZERS			
PS-MNT-PEL-101	Pelletizers	In Pelletizers, you will learn about pelletizer operation and components; process safety; routine and extended maintenance, including lubrication and inspection, bearing vibration and temperature data collection, pelletizer knife maintenance and shaft alignment, screen pack replacement; and troubleshooting.	4
ROTARY FEEDERS			
PS-MNT-RFE-101	Rotary Feeder	In Rotary Feeder Maintenance, you will learn about routine and extended maintenance, rotary feed installation and removal; equipment faults, possible causes, and corrective measures.	1.5

PETROLEUM INDUSTRY OVERVIEW			
COURSE #	COURSE TITLE	DESCRIPTION	HRS
GAS PROCESSING			
PS-EPT-INO-114	Gas Processing Overview	In Gas Processing Overview, you will learn about saleable products recoverable from raw, produced gas; gas composition and contaminants; sales gas specifications; gas sweetening and dehydration; hydrocarbon liquid products and extraction processes, Nitrogen removal and helium recovery; NGL fractionation/stabilization; NGL product treating; and sulfur recovery and disposal.	3
INDUSTRY OVERVIEW			
PS-EPT-INO-101	Modern Oil and Gas Industry	In Modern Oil and Gas Industry, you will learn about the historical, geographical, and modern context of the petroleum industry; its organization, the petroleum value chain, and economic drivers.	2
MIDSTREAM INDUSTRY SEGMENT			
PS-EPT-INO-112	Overview of the Midstream Industry Segment	In Overview of the Midstream Industry segment, you will learn about the Petroleum Value Chain, the midstream segment, conventional and unconventional reservoirs, the crude oil and natural gas value chains and value chain investment trends; natural gas terminology, global energy demand and trade, gas production and contracts; and gas processing, including end use products, contaminants and sales gas specifications, gas conditioning, dehydration, hydrocarbon dewpoint control, NGL extraction and stability, and NGL product treating.	3
PETROCHEMICALS			
PS-EPT-INO-119	Introduction to Solvents	In Introduction to Solvents, you will learn about basic solvent chemistry, its purpose and selection. Solvent chemistry, including types of bonds, electronegativity, and polar bonds are covered. Polar (protic and aprotic) and non-polar types of solvents are explained, as well as what defines organic and inorganic solvents. Chemical and hydrocarbon solvent properties, are covered, such as viscosity, solubility, relative evaporation rate (RER), density, and surface tension, along with health, safety, and environmental considerations. Finally, you will learn about solvent applications, such as paints, sealants, cleaners, and polishes; drilling and metalworking fluids; water treatment; pesticides; concrete release fluids, and heat transfer fluids.	2
PS-EPT-INO-117	Steam Cracking	Steam cracking is the main production process for petrochemicals, including ethylene, propylene and butadiene. The process involves breaking long chain hydrocarbons into shorter chains. In "Steam Cracking", you will learn about types of steam crackers and the functions performed in key areas, including the furnace, quench, compression, and chilling and separation sections. You will also learn about the difference between conversion and selectivity and the factors that affect ethane selectivity.	1
PIPELINE SYSTEMS			
PS-EPT-INO-113	Pipelines and Storage Systems	In Pipelines and Storage Systems, you will learn about the different hydrocarbon transportation systems, advantages of pipelines, pipeline projects, pipeline construction and types of pipelines; pipeline system design and components; pipeline problems and protection; and pigging. In addition, you will learn about hydrocarbon storage systems for liquids and gases, including appropriate types of tank designs and use of depleted reservoirs and salt caverns.	2
REFINING			
PS-EPT-INO-115	Fundamentals of Refining	In Fundamentals of Refining, you will learn about the refining industry as part of the downstream petroleum value chain including characteristics of crude oil and the refining products made from it, refining economics, a typical refinery configuration with its process streams and units.	2
SURFACE PROCESSING			
PS-EPT-INO-111	Surface Processing of Produced Fluids	In Surface Processing of Produced Fluids, you will learn about the integrated production system, fluid separation, emulsion breaking, crude products, gas separation and natural gas processing, NGL usage, and natural gas conversion to LNG and GTL.	1

PROCESS SAFETY

COURSE #	COURSE TITLE	DESCRIPTION	HRS
EMERGENCY PLANNING & RESPONSE			
A1112	Fire Fighting: Extinguishing Agents	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Extinguishing Agents, you will learn about the use of water, foam, carbon dioxide, dry chemicals, halons, and dry powders for controlling or extinguishing fires and for protecting men and equipment. You will also learn about proper hose handling and how to use small and large handlines, monitors, and fixed spray systems.	4
A1111	Fire Fighting: Fuels and Combustion	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, Fuels and Combustion, you will learn that fire is combustion requiring fuel, oxygen, and a source of ignition. You will also learn about the flammability of typical liquid and vapor fuels, the sources of oxygen, the sources of ignition, and the causes and effects of various kinds of explosions and detonations. Finally, you will learn the three ways of extinguishing fires—quenching, smothering, and starving—and the techniques of dispersing flammable vapors to keep them from igniting or re-igniting during a fire.	3
A1113	Fire Fighting: Portable Fire Extinguishers and Foams	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. In this program, you will learn about portable fire extinguishers, which are the first line of defense in many fire situations. This program covers how to select and operate them properly. You will also learn about the construction of CO2 and dry chemical extinguishers and how they are used for putting out small fires. Finally, you will learn about the use of foam for extinguishing large area flat fires, and how both chemical foams and air foams are prepared and applied.	4
A1114b	Fire Fighting: Strategies	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. Your ability to prevent a fire or react to a fire emergency may depend on how well you planned ahead for that particular situation. Planning ahead means that you have identified fire problem areas, developed the appropriate action plans, and prepared to fight a fire with the proper firefighting equipment, techniques and tactics. In this program, you will learn pre-fire planning and basic strategy. You will also learn strategies for fighting tank and dike fires. Finally, you will apply what you have learned in exercises that cover all different types of fires.	3
A1114a	Fire Fighting: Tactics	Fire Fighting is a series of five learning programs which primarily focus on the principles of fighting Class B fires involving oils and gases. The way you attack a fire depends on several different factors, including how the fuel is burning and the location of the fire. It is important that you know and can implement the correct attack for any type of fire. In this program, you will learn the tactics of hose handling, of operating valves under fire exposure, of using dry chemical and foam, and of protecting pressure vessels.	3
SAFE WORK PRACTICES			
A1197	Job Hazard Analysis and Stop Work Authority	Working within the process industry can result in exceptionally high safety risks, and employers put programs in place to reduce the likelihood of accidents and injuries. Job Safety Analysis (JSA) and Stop Work Authority (SWA) require all employees to watch for safety risks and potential hazards. In this program, you will learn about JSAs and SWA and how you can help implement both.	1
A1170	Safe Handling of Light Ends	In this program, you will learn the physical properties of gaseous hydrocarbons that create hazards, and the special handling and safety procedures that are required.	3

PRODUCTION OPERATIONS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
PROCESS SAFETY MANAGEMENT			
A1638	SEMS Standard and Requirements	In SEMS Standards and Requirements, you will learn about the Bureau of Ocean Energy Management (BOEM) and Bureau of Safety Environmental Enforcement (BSEE) regulations established in 30 CFR, 250, Subpart S.	1
PSST (T2)			
A1639	Reducing Marine Trash and Debris	Reducing Marine Trash and Debris is designed to help you meet the training requirements of 30 CFR 250.300 (a) and (b)(6). It covers information related to marine trash and debris in offshore environments, including how to report pollution, and how to prevent it.	1
A1632	Well Control and Production Safety Regulations	In this third program in the series, operators will learn about regulatory requirements governing well control and production safety duties specified in 30 CFR 250, including pollution prevention requirements, well completion requirements, and oil and gas drilling requirements. This program is designed for Mechanics and Electricians, "B" Operators, Instrument and Electrical Technicians, "A" Operators, Senior (Lead) Operators, Production Foremen and/or other positions.	3

REFINERY OPERATIONS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
TURNAROUND			
PS-REF-TUR-101	Turnaround Operations	During process operations, equipment becomes less flexible and increasingly unable to reach maximum production capacity because operating conditions deteriorate. To keep conditions optimal for production, process facilities schedule turnaround (T/A) operations to restore unit operating capabilities. In this series, you will learn about T/A operations, how they are implemented, and the overall impact a turnaround operation has on facility costs.	5

ROTATING & RECIPROCATING EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
AIR COMPRESSORS			
A1050	Air Compressors	In Air Compressors, you will learn about the different types and applications used in the oil and gas industry including their principles of operation based upon Boyle's and Charles gas laws, reciprocating and rotary positive displacement compressors, and centrifugal, ejector and axial flow dynamic compressors.	1
CENTRIFUGAL COMPRESSORS			
A1053a	Centrifugal Compressors: Introduction	In the hydrocarbon processing and production industry, gas is compressed for transportation to consuming markets and for use in processing operations. This program is about the construction and operation of compressors. In this program you will learn the construction, principal parts, and operation of reciprocating compressors.	3
A1053b	Centrifugal Compressors: Construction and Operation	In the hydrocarbon processing and production industry, gas is compressed for transportation to consuming markets and for use in processing operations. This program is about the construction and operation of compressors. In this program you will learn about the construction and operation of centrifugal compressors.	4
CENTRIFUGAL PUMPS			
A1071b	Centrifugal Pumps: Equipment and Operation	Centrifugal pumps are machines which use centrifugal force to move liquids. In this program, you will learn about the construction of pump parts, including packing boxes, seals, bearings, balancing drums, and couplings. You will learn the relation of alignment and misalignment to vibration, how pumps are lubricated, and how they are cooled in operation. Finally, you will learn the details of pump operation including start-up, normal operation, and shut-down. You will learn what the common problems of centrifugal pump operation are and how to spot and correct them, and how to maintain the pumps for dependable, safe operation.	4
A1071a	Centrifugal Pumps: Introduction	Centrifugal pumps are machines that use centrifugal force to move liquids. In this program, you will learn the principles, parts, and general operation of these pumps, what pump efficiency is, and how head and pressure are calculated.	3
CONDITION MONITORING			
PS-MNT-CMO-105	Condition Monitoring - Agitators and Mixers	In Condition Monitoring - Agitators and Mixes, you will learn about agitator and mixer detectable faults and common problems.	0.5
PS-MNT-CMO-102	Condition Monitoring - Compressors	In Condition Monitoring - Compressors, you will learn about centrifugal, axial, reciprocating, and screw compressor monitoring.	1
PS-MNT-CMO-103	Condition Monitoring - Pumps	In Condition Monitoring - Pumps, you will learn about centrifugal and positive displacement pump detectable faults and allowable vibration.	1
PS-MNT-CMO-104	Condition Monitoring - Turbines, Fans and Blowers	In Condition Monitoring - Turbines, Fans and Blowers, you will learn about turbine diagnostics, critical speeds, and vibration limits; common problems with fans and blowers.	1
PS-MNT-RED-101	Rotating Equipment Condition Diagnosis	In Rotating Equipment Condition Diagnosis, you will learn about vibration theory, including harmonic motion, RMS vs. peak, time and frequency domain; FFT algorithms, frequency spans, spectrum, and measurement basics; accelerometers; vibration due to imbalance, misalignment, or looseness; gear problems; bearing failures; peak-vue analysis; severity charts and standards; oil analysis; and selecting measurement parameters to determine optimum maintenance intervals.	5
COUPLINGS AND GEARS			
A1085b	Couplings, Gear Trains, and V-Belts: Gear Trains and V-Belt Drives	This program covers two different ways prime movers or drivers are connected to driven equipment, the special advantages and problems of each of the different ways, and the adjustment and preventive maintenance of different types of coupling equipment. Also covered are the physical principles of power transmission, and the relationship of speed and torque as different forms of power. You will learn about simple and compound gear trains, and how gear trains may be used as speed changers or torque increasers. You will learn about spur, helical, double-helical, bevel, and worm gears, and the uses of each. You will learn about gear lubrication and about handling the shock loads that your equipment applies to gears. Finally, you will learn about the construction and uses of the different types of single and multiple V-belt drives, the use of V-belt drives as speed changes, the adjustment and replacement of V-belts, and the control of slippage.	4
A1085a	Couplings, Gear Trains, and V-Belts: Machine Connections and Couplings	This program covers one way drivers are connected to driven equipment. You will learn about the special advantages and problems associated with couplings, and their adjustment and preventive maintenance requirements. In this program, you will learn about the causes and control of misalignment, end float, surges in torque, and the different basic types of rigid and flexible couplings.	3

COURSE #	COURSE TITLE	DESCRIPTION	HRS
DYNAMIC COMPRESSORS			
PS-MNT-DYC-102	Dynamic Compressor Systems, Seals and Routine Tasks	In Dynamic Compressor Systems, Seals and Routine Tasks, you will learn about compressor construction, systems, bearings, balancing drums, seals and routine tasks including safe startup and shutdown.	5
PS-MNT-DYC-101	Dynamic Compressors: Introduction and Operation	In Dynamic Compressors: Introduction and Operation, you will learn about energy and compression, centrifugal and axial compressors; compression ratio and capacity, head of compression, R, RPM, and horsepower.	4
DYNAMIC PUMPS			
PS-MNT-DYP-101	Dynamic Pumps	In Dynamic Pumps, you will learn about fluid flow, dynamic pump properties and applications; installing, removing, and maintaining dynamic pumps; types of seals and seal maintenance; performing a major pump overhaul, and troubleshooting.	5
A1070	Introduction to Dynamic Pumps	In Introduction to Dynamic Pumps, you will about fluid flow, dynamic pump classifications and properties of the two dynamic pump types - axial and centrifugal.	1
FANS AND BLOWERS			
PS-MNT-FBL-101	Fans and Blowers	In Fans and Blowers, you will learn about centrifugal, cross-flow, and axial flow fans, mechanical draft, positive displacement, and dynamic blowers; fan and blower system characteristics, and fan efficiency.	3
PS-MNT-FBL-102	Fans and Blowers Maintenance	In Fans and Blowers Maintenance, you will learn about performing routine and extended maintenance on fans and blowers, including belt, bearing, fan, motor, and other component inspections; fan and blower installation and removal; and assessment and troubleshooting.	2
GAS TURBINES			
A1083b	Combustion Gas Turbines: Equipment and Operation	In Combustion Gas Turbines: Systems and Operation, you will learn about the functions of casing seals, bearings and lubrication in a combustion gas turbine. The program also covers the control and operation of combustion gas turbines, including start-up, operating, and shutdown procedures, and the control of vibration, critical speed, and turbine imbalance. Finally, you will learn about temperature control, the use of turning gears, and turbine control using the automated control panel. Through this understanding of turbine principles, construction, and control, you will be better able to secure efficient and safe turbine operation.	4
A1083a	Combustion Gas Turbines: Introduction	In Combustion Gas Turbines you will learn the operating principles of the compressor, the combustion chamber, and turbine section. You will also learn about the construction of the compressor, combustion chamber, and turbine section; the blading arrangement; and the use of the turbine as a driver and hot-gas generator. Also covered is turbine auxiliary equipment such as starting devices, governors, and overspeed mechanisms, and their functions.	4
PS-MNT-GTU-101	Gas Turbines for Technicians	In Gas Turbines for Technicians, you will learn about gas turbine classification, operation, components, and applications; routine and extended maintenance; and gas turbine troubleshooting, including lubrication, vibration, and efficiency problems.	5
INTERNAL COMBUSTION ENGINES			
A1084a	Internal Combustion Engines: Introduction	Internal combustion engines are engines which burn fuel in a cylinder to produce power. Presented in this program are the principles of the internal combustion engine, and its general operation and parts. You will learn how the combustion cycle differs in 2-cycle and 4-cycle engines. You will also learn some of the more common cylinder arrangements. Also covered are the details of the construction of an internal combustion engine, including the camshaft, carburetor, natural gas admission system, safety devices, and the electrical system. You will learn how each of these parts functions as a part of the total engine. Finally, you will learn the principles of a diesel engine, how it operates and how it differs from the traditional IC engine.	4
A1084b	Internal Combustion Engines: Operating Techniques	Internal combustion engines are engines which burn fuel in a cylinder to produce power. In this program, you will learn the details of the auxiliary systems of IC engines and how they operate, including the cooling system, lubrication system, air cleaners, superchargers and exhaust systems. You will also learn the operation and maintenance of the engine, how to read an instrument panel and interpret gauge readings, typical engine start-up and shut-down procedures, and preventive maintenance procedures for daily, weekly and monthly checks.	3
PS-MNT-SPP-101	Spark Plugs	In Spark Plugs, you will about learn the purpose, design characteristics and selection criteria of spark plugs; common failure causes; typical removal and installation procedures.	1

COURSE #	COURSE TITLE	DESCRIPTION	HRS
MIXERS AND BLENDERS			
PS-MNT-MXB-201	Mixers and Blenders	In Mixers and Blenders, you will learn about the difference between liquid and solid blending; solids mixing, including convective, shear, and diffusive mixing; fluids mixing, including bulk transport, molecular diffusion, and turbulent and laminar mixing; semi-solid mixing; advantages and disadvantages of batch and continuous mixing; types of mixing equipment, including blenders, agitators, and heavy duty mixers.	1
POSITIVE DISPLACEMENT COMPRESSORS			
A1052b	Positive Displacement Compressors: Construction and Operation	In the hydrocarbon processing and production industry, gas is compressed for transportation to consuming markets and for use in processing operations. This program is about the construction and operation of compressors. In this program you will learn the construction, principal parts, and operation of reciprocating compressors.	4
A1052a	Positive Displacement Compressors: Introduction	In the hydrocarbon processing and production industry, gas is compressed for transportation to consuming markets and for use in processing operations. This program is an introduction to positive displacement compressors. In this program you will learn the operating principles of reciprocating compressors, the different types of rotary compressors, and techniques for controlling compressor output.	3
POSITIVE DISPLACEMENT PUMPS			
PS-MNT-PDP-101	Positive Displacement Pumps for Technicians	In Positive Displacement Pumps for Technicians, you will learn about pump classification, drives, pump installation and removal, routine maintenance, and troubleshooting.	3
A1072b	Positive Displacement Pumps: Equipment and Operation	Positive displacement pumps are reciprocating and rotary pumps that move liquid by the positive displacement of liquid volume. In this program, you will learn about packing, lubrication, and cooling systems, the construction and operation of pump valves, pulsation dampeners and suction stabilizers, variable displacement devices and bypasses and relief valves. Finally, you will learn startup and shutdown procedures, how to recognize and solve common pumping problems; and proper operating maintenance.	4
A1072a	Positive Displacement Pumps: Introduction	Positive displacement pumps are reciprocating and rotary pumps that move liquid by the positive displacement of liquid volume. In this program, you will learn the operating principles and performance characteristics of positive displacement pumps, what determines their capacity, pressure, horsepower and efficiency, and how NPSH is calculated. You will also learn the basic types of reciprocating and rotary pumps, including piston pumps, plunger pumps, diaphragm pumps, direct-acting steam and air pumps, and rotary lobe, vane, gear and screw pumps, and how these pumps differ from each other in design and performance.	4
RECIPROCATING COMPRESSORS			
PS-MNT-RCO-101	Reciprocating Compressors	In Reciprocating Compressors, you will learn about positive displacement (PD) compressor performance, stages, and construction, lubricated compressors and labyrinth pistons; compression cycle and compression ratio, P-V diagrams, double-acting cylinders; capacity control; cylinder arrangement and components; lubrication and cylinder cooling systems; installing and maintaining reciprocating compressors; preventive maintenance, and troubleshooting.	5
STEAM ENGINES AND PUMPS			
A1086a	Steam Engines and Pumps: Introduction	In Introduction to Steam Engines and Pumps, you will learn about steam engine and pump basics, steam engine and pump valves, constructing steam engines and pumps, and steam engine control.	4
A1086b	Steam Engines and Pumps: Operation and Maintenance	In Steam Engines and Pumps: Operation and Maintenance, you will learn about steam engine control systems, steam engine lubrication, operation and maintenance, and steam pumps.	4

COURSE #	COURSE TITLE	DESCRIPTION	HRS
STEAM TURBINES			
A1082b	Steam Turbines: Equipment and Operation	Steam turbines may differ from one another in size, appearance, and construction, but all steam turbines are similar in operation and work on similar principles. In this program, you will learn about the construction of the turbine, including rotor and casing, diaphragms, seals, and packing boxes, and labyrinth and carbon ring packing. You will also learn about the construction of the bearings and bearing combinations used in turbines, of single- and multi-valve governors, and of the oil circulation system. And finally, you will learn turbine operation and operating problems; the effects of pressure, heat, and steam condensation; uneven heating and cooling; leakage of steam; vibration; lubrication and lubrication problems; speed adjustment, instrumentation, and the visual inspections that must be conducted before startup. With this understanding of turbine principles, construction and control, you will be able to ensure the efficiency and safety of turbine operations.	4
A1082a	Steam Turbines: Introduction	Steam turbines may differ from one another in size, appearance, and construction, but all steam turbines are similar in operation and work on similar principles. In this program, you will learn how impulse and reaction turbines convert thermal energy to mechanical energy, how condensing and non-condensing turbines work, how turbine speed is controlled, and how the over-speed trip protects the turbine against failure of other speed controls.	3

STATIONARY EQUIPMENT

COURSE #	COURSE TITLE	DESCRIPTION	HRS
VALVES			
A1206	Valve Maintenance	This program reviews the various types of valves in piping systems and the maintenance required to keep them in good operating condition. You will learn how to lubricate valves, adjust valve packing, and inspect steam traps.	2
A1140a	Valves: Introduction to Valves	Valves are used to control the flow of liquids and gases. In this program, you will learn about the construction and operation of the most widely used valves, such as gate, globe, plug, and check valves.	4
A1140b	Valves: Operating Valves	Valves are used to control the flow of liquids and gases. In this program, you will learn to operate and maintain valves. You will also learn what valves should be used with various types of service and how to troubleshoot difficulties that may develop due to fouling, leakage, or wear.	3

UTILITY, SAFETY AND FACILITY SYSTEMS

COURSE #	COURSE TITLE	DESCRIPTION	HRS
COMPRESSED AIR SYSTEMS			
PS-MNT-AIR-102	Compressed Air Dryers	In this course, you will learn the purpose and operational theory behind the more common types of air dryers including regenerative, absorption, refrigeration and mechanical dryers, and how they fit into a compressed air system.	1
PS-MNT-PNE-101	Pneumatic Systems	In Pneumatic Systems, you will learn about pneumatic system components, common pneumatic valves; working safely with pneumatic systems; schematics and troubleshooting; and removing and installing components.	2
PS-MNT-AIR-101	Utility and Instrument Air Systems	In Utility and Instrument Air Systems, you will learn about compressed air systems, components, piping configuration, methods of moisture removal, and the hazards and risks associated with them.	1.5
FIRE AND GAS SYSTEMS			
PS-EIA-FDE-101	Fire Detection	In Fire Detection, you will learn about fire detection systems, including heat, smoke, and flame detectors; hydrocarbon emissions, UV/IR sensors and how to calibrate and troubleshoot these systems.	2
PS-MNT-FPS-101	Fire Protection Systems	In Fire Protection Systems, you will learn how about fire protection system components, fire pump types, operation, and maintenance; gas detector system types and sensors; Fire/gas detection system types, control, and operation; fire/gas protection systems, extinguishers, and maintenance, and fire/gas panels and maintenance.	6
PS-EIA-FSD-101	Flame Scanning Devices	In Principles of Flame Scanning Devices, you will learn about flame scanning devices, features, and how they operate; calibration, false alarms, proper installation and detection range, the square law, and testing; and maintaining and troubleshooting fire eye flame scanners.	2
PS-EIA-GDE-101	Gas Detection	In Gas Detection, you will learn about gas terminology, combustible gas detection, sensor types and features; detector and sensor calibration and troubleshooting.	1.5
GENERATOR AND EMERGENCY POWER SYSTEMS			
PS-MNT-DEG-101	Diesel Engine Generators	In Diesel Engine Generator, you will learn about how diesel engine generators work; their main components, including cooling, exhaust, and lubricating systems, engine, battery charger, control panel and main assembly frame; and how to maintain and inspect diesel engines, including general maintenance checks, procedures, and troubleshooting.	2
PS-MNT-EMB-101	Emergency Backup	In Emergency Backup, you will learn about emergency power systems, emergency and diesel generator power, critical and essential loads, uninterruptible power supplies (UPS), and standby generator maintenance.	1.5
PS-EIA-EPS-101	Emergency Power Systems	In this course, you will learn about emergency power systems and how they compare to standby power systems including power requirements according to international standards; the typical emergency backup system, configuration, and components; and the different types of UPS systems.	1
HVAC SYSTEM			
PS-MNT-HVC-101	HVAC Fundamentals	In HVAC Fundamentals, you will learn about the fundamentals of heating, ventilation and air conditioning systems including the types of heat transfer, HVAC system components, HVAC system operation, and the vapor compression and refrigeration cycle.	1
PS-MNT-HVC-102	Maintaining HVAC Systems	In Maintaining HVAC Systems, you will learn about the vapor compression cycle, HVAC components, window and package air conditioning unit maintenance; common mechanical faults and component malfunction troubleshooting..	4
HYDRAULIC SYSTEMS			
PS-MNT-HYD-101	Hydraulic Systems	In Hydraulic Systems, you will learn about hydraulic principles, pressure and flow, hydraulic components; controlling direction, speed, and pressure; hydraulic safety; nitrogen accumulators, maintaining hydraulic systems, storage and handling; hydraulic symbols and schematics, and troubleshooting.	4
LIQUID NITROGEN SYSTEMS			
PS-MNT-LNN-101	Liquid Nitrogen Storage Systems	In Liquid Nitrogen Storage Systems, you will learn about the properties and characteristics of nitrogen, the major health hazards and precautions for handling, common industry applications for nitrogen, and the major system equipment in a liquid nitrogen storage system.	0.75
PLANT COMMUNICATION SYSTEMS			
A1192	Plant Radio Communication	In Plant Radio Communication, you will learn how to operate plant radio equipment to communicate effectively and according to FCC rules.	1

COURSE #	COURSE TITLE	DESCRIPTION	HRS
POWERED INDUSTRIAL EQUIPMENT			
PS-MNT-FOM-101	Forklifts	In Forklifts, you will learn about basic principles of forklift operation, applications, pallets and stillages, palletless handling, hydraulically powered fork options, telescopic handlers, inspection and certification.	1
PRESSURE SAFETY DEVICES			
PS-MNT-PRS-101	Pressure Relief Safety Devices	In Pressure Relief Safety Devices, you will learn about the purpose of pressure relief safety devices, common types including conventional relief valve, balanced relief valve, pilot operated relief valve and rupture disk; the difference between a full lift, high lift, or low lift pressure relieving safety device, internal material options for the different service conditions and major factors involved in the selection of a pressure relieving safety device.	0.5
WAREHOUSING			
PS-MNT-BAM-101	Laydown Yards and Area Management	In Laydown Yards and Area Management, you will learn about identifying and establishing laydown yards, controls and security, and preventive maintenance; scrap yard management, engineering controls, site layout, and contamination control; lubricant storage and spill prevention and recovery; maintenance related buildings, managing resources, and compliance and auditing.	3.5

AMERICAS - US, Canada and Latin America:

HPS-Training-US/CAN/LAR@Honeywell.com

EMEA - Europe, Middle East and Africa:

HPS-Training-EMEA@Honeywell.com

APAC - Asia Pacific:

HPS-Training-APAC@Honeywell.com

Honeywell Process Solutions

2101 CityWest Blvd, Houston, TX 77042

Honeywell House, Arlington Business Park
Bracknell, Berkshire, England RG12

1EB Shanghai City Centre, 100Junyi
Road Shanghai, China 20051

process.honeywell.com

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