



Industrial Maintenance: Mechanic

- **00101-09 Basic Safety**

Explains the safety obligations of workers, supervisors, and managers to ensure a safe workplace. Discusses the causes and results of accidents and the dangers of rationalizing risk. Reviews the role of company policies and OSHA regulations in maintaining a safe workplace. Introduces common job-site hazards and protections such as lockout/tagout, personal protective equipment (PPE), and HazCom.
- **00102-09 Introduction to Construction Math**

Reviews basic mathematical functions such as adding, subtracting, dividing, and multiplying whole numbers, fractions, and decimals, and explains their applications to the construction trades. Explains decimal-fraction conversions and the metric system using practical examples. Also reviews basic geometry as applied to common shapes and forms.
- **00103-09 Introduction to Hand Tools**

Introduces trainees to hand tools that are widely used in the construction industry, such as hammers, saws, levels, pullers, vises, and clamps. Explains the specific applications of each tool and shows how to use them properly. Also discusses important safety and maintenance issues related to hand tools.
- **00104-09 Introduction to Power Tools**

Provides detailed descriptions of commonly used power tools such as drills, saws, grinders, and sanders. Reviews applications, proper use, safety, and maintenance. Many illustrations show power tools used in on-the-job settings.
- **00105-09 Introduction to Construction Drawings**

Covers construction drawings, components, and symbols. Discusses different types of drawings and describes how to interpret and use drawing dimensions. Four oversized drawings are included.
- **00106-09 Basic Rigging**

Explains how ropes, chains, hoists, loaders, and cranes are used to move material and equipment from one location to another on a job site. Describes inspection techniques and load-handling safety practices. Also reviews American National Standards Institute (ANSI) hand signals.
- **00107-09 Basic Communication Skills**

Provides trainees with techniques for communicating effectively with co-workers and supervisors. Includes practical examples that emphasize the importance of verbal and written information and instructions on the job. Also discusses effective telephone and e-mail communication skills.
- **00108-09 Basic Employability Skills**

Identifies the roles of individuals and companies in the construction industry. Introduces trainees to critical thinking and problem solving skills and computer systems and their industry applications. Also reviews effective relationship skills, effective self-presentation, and key workplace issues such as sexual harassment, stress, and substance abuse.
- **00109-09 Introduction to Material Handling**

Describes hazards associated with materials handling and safe materials handling

techniques and procedures. Introduces materials handling equipment for common job-site tasks.

Level One

- **32101-07 Orientation to the Trade**
Covers the history of the trade, and the kinds of work and work environments industrial maintenance craftspeople would find in the field. Describe the apprenticeship and training programs available, as well as the career opportunities in industrial maintenance. The responsibilities and characteristics a worker should possess are also described.
- **32102-07 Tools of the Trade**
Provides an introduction to the hand and power tools used in industrial maintenance. Covers safety procedures and techniques for use of these tools.
- **32103-07 Fasteners and Anchors**
Covers the hardware and systems used by an industrial maintenance craftsperson. Describes various types of anchors and supports, their applications, and how to install them safely.
- **32104-07 Oxyfuel Cutting**
Explains the safety requirements for oxyfuel cutting. Identifies oxyfuel cutting equipment and provides instructions for setting up, lighting, and using the equipment. Includes straight line cutting, piercing, beveling, washing, and gouging.
- **32105-07 Gaskets and Packing**
Introduces types of gaskets and gasket material, types of packing and packing material, and types of O-ring material. Explains the use of gaskets, packing, and O-rings, and teaches how to fabricate a gasket.
- **32106-07 Craft-Related Mathematics**
Explains how to use ratios and proportions, solve basic algebra, area, volume, and circumference problems, and solve for right triangles using the Pythagorean theorem.
- **32107-07 Construction Drawings**
Introduces the trainee to plot plans, structural drawings, elevation drawings, as-built drawings, equipment arrangement drawings, P&IDs, isometric drawings, basic circuit diagrams, and detail sheets.
- **32108-07 Pumps and Drivers**
Explains centrifugal, rotary, reciprocating, metering, and vacuum pump operation and installation methods, as well as types of drivers. Also covers net positive suction head and cavitation.
- **32109-07 Valves**
Identifies and provides installation methods for different types of valves. Also covers valve storage and handling.

- **32110-07 Introduction to Test Instruments**
Introduces the basic test equipment for industrial maintenance, including tachometers, pyrometers, strobe meters, voltage testers, and automated diagnostic tools.
- **32111-07 Material Handling and Hand Rigging**
Introduces the equipment and techniques of material handling, and describes the procedures for rigging and communicating with riggers.
- **32112-07 Mobile and Support Equipment**
Introduces the safety procedures and methods of operation for motorized support equipment, including forklifts, manlifts, compressors, and generators.
- **32113-07 Lubrication**
Explains lubrication safety, storage, and classifications. Also explains selecting lubricants, additives, lubrication equipment, and lubricating charts.

LEVEL TWO

- **32201-07 Basic Layout**
Discusses the tools used in layout. Explains how to lay out baselines using the arc method and 3-4-5 method.
- **32202-07 Introduction to Piping Components**
Introduces chemical, compressed air, fuel oil, steam, and water systems. Explains how to identify piping systems according to color codes.
- **32203-07 Copper and Plastic Piping Practices**
Covers the selection, preparation, joining, and support of copper, plastic piping and fittings.
- **32204-07 Introduction to ferrous Metal Piping Practices**
Covers various types of iron and steel pipe and fittings and provides step-by-step instructions for cutting, threading, and joining ferrous piping.
- **32205-07 Identify, Install, and Maintain Valves**
Explains how to remove and install threaded and flanged valves, how to replace valve stem O-ring and bonnet gaskets, and how to repack a valve stuffing box. Also discusses the purpose of valve packing.
- **32206-07 Hydrostatic and Pneumatic Testing**
Describes non-destructive and pressure testing of systems and equipment.
- **32207-07 Introduction to Bearings**
Introduces plain, ball, roller, thrust, guide, flanged, pillow block, and takeup bearings. Discusses bearing materials and designations.
- **32208-07 Low-Pressure Steam Systems**
Introduces the components and functions of basic steam systems, including boilers, steam traps, and blowdown recovery systems.

- **32209-07 High-Pressure Steam Systems and Auxiliaries**
Explains the functioning of high-pressure steam systems used in the industry.
- **32210-07 Distillation Towers and Vessels**
Introduces the various types and functioning of distillation towers and vessels, including recovery vessels and condensate processing.
- **32211-07 Heaters, Furnaces, Heat Exchangers, Cooling Towers, and Fin Fans**
Introduces the trainee to the equipment used to transfer and remove heat from systems in process.
- **32212-07 Introduction to Tube Work**
Covers the basics of working with heat exchanger and furnace tubing and tube sheets.

LEVEL THREE

- **32301-08 Advanced Towers and Vessels**
Covers cat crackers, process vessels, and chemical reactors in greater depth.
- **32302-08 Advanced Trade Math**
Explains right triangle trigonometry and its use in the trade. Also covers interpolation, equilateral and isosceles triangles and the laws of acute triangles.
- **32303-08 Precision Tools**
Explains how to select, inspect, use and care for levels, feeler gauges, calipers, micrometers, height gauges and surface plates, dial indicators, protractors, parallels and gauge blocks, trammels, and pyrometers.
- **32304-08 Installing Bearings**
Explains how to remove, troubleshoot, and install tapered, thrust, spherical roller, pillow block, and angular contact ball bearings.
- **32305-08 Installing Couplings**
Identifies various types of couplings, and covers installation procedures using the press-fit method and the interference-fit method. Also covers coupling removal procedures.
- **32306-08 Conventional Alignment**
Covers types of misalignment, aligning couplings using a straightedge and feeler gauge, adjusting parallel and angular alignment, using a dial indicator, and eliminating coupling stress.
- **32307-08 Setting Baseplates and Prealignment**
Explains how to lay out and install baseplates and soleplates. Describes how to field-verify a plate installation. Covers precision leveling procedures and performing clearance installation. Also describes basic steps for setting motors and pumps

- **32308-08 Installing Mechanical Seals**
Covers the function and advantages of mechanical seals, identifies parts and types of seals, and includes procedures for removing, inspecting, and installing mechanical seals.
- **32309-08 Installing Belt and Chain Drives**
Covers the sizes, uses, and installation procedures of six types of drive belts and two types of chain drives.

LEVEL FOUR

- **32401 Practical Applications of Lighting**
Covers various lighting installations, applications, and wiring systems.
- **32402 Standby and Emergency Systems**
NEC® installation requirements for electric generators and storage batteries are fully explained.
- **32403 Advanced Controls**
Explains operating principles of solid-state controls along with their practical applications. Motor braking, jogging, plugging, and safety interlocks are also covered.
- **32404 Commercial and Industrial Refrigeration**
Covers components and operation of refrigeration systems, with emphasis on systems used in cold storage and other commercial food preservation applications. Also covers the components and operation of ice-making machines.
- **32405 Electricity in HVAC Systems**
Covers the basic principles of refrigeration and air conditioning, NEC® requirements, compressors, and HVAC control wiring and troubleshooting.
- **32406 HVAC Controls**
Focuses on advanced HVAC controls in utilizing solid-state circuitry.
- **32407 Conventional Alignment**
Covers types of misalignment, aligning couplings using a straightedge and feeler gauge, adjusting face and OD alignment using a dial indicator, and eliminating coupling stress.
- **32408 Maintaining Valves**
Explains how to remove and install threaded and flanged valves, how to replace valve stem O-ring and bonnet gaskets, and how to repack a valve stuffing box. Also discusses the purpose of valve packing.
- **32409 Identifying and Installing Valves**
Identifies and provides installation methods for different types of valves. Also covers valve storage and handling.

- **2410 Steam Traps**
Identifies types of steam traps, including mechanical, thermostatic, and thermodynamic steam traps, as well as strainers. Explains how to install steam traps and troubleshoot steam trap systems.
- **32411 Steam Systems**
Covers safety procedures, turn-on, operation, and shutdown as well as preventive maintenance procedures, piping systems associated with steam heating systems, and steam traps.
- **32412 Programmable Logic Controllers (from Instrumentation)**

Enables the trainee to properly describe the general functions, parts, and uses of programmable logic controllers.
- **32413 High-Voltage Terminations/Splices**
Offers an overview of the NEC® and cable manufacturer's requirements for high voltage terminations and splices.
- **32414 Vibration Analysis**
Covers the causes for vibration, vibration monitoring programs, vibration test equipment, and how to field balance machines.
- **32415 Commercial Heating and Cooling Systems**
Covers operating principles, safety concerns, piping systems, and service requirements associated with different types of boilers, chillers, chilled water systems, and absorption equipment.

LEVEL FIVE

- **32501 Preventive and Predictive Maintenance**
Covers nondestructive testing, ultrasonics, radiography, eddy current inspection, magnetic particle inspection, acoustic emissions, infrared testing, vibration analysis, and tribology.
- **32502 Performing Reverse Alignment**
Using the reverse dial indicator method, trainees will identify improper pipe hanger placement, measure shaft runout, and set up complex reverse dial indicator jigs and chart alignment.
- **32503 Performing Laser Alignment**
Covers the use and operation of laser alignment systems and how to measure shaft sag, perform vertical alignment, and align machinery trains.
- **32504 Troubleshooting and Repairing Pneumatic Equipment**
Covers how to perform preventive maintenance, inspect components, and read schematic diagrams. Includes troubleshooting and repair procedures for pneumatic systems.
- **32505 Troubleshooting and Repairing Pumps**
Covers how to inspect, troubleshoot, and prepare pumps for shutdown.

Includes removing pumps from the system, disassembly, and reassembly procedures.

- **32506 Troubleshooting and Repairing Hydraulic Equipment**
Explains how to inspect, troubleshoot, and repair hydraulic systems and components. Includes exercises on reading system schematic diagrams.
- **32507 Troubleshooting and Repairing Gearboxes**
Explains how to inspect, remove, reassemble, install, and maintain gearboxes. Covers measuring and adjusting backlash and bearing clearance.
- **32508 Programmable Logic Controllers (from Electrical)**
Covers the hardware and software used in modern programmable logic control systems. Also covers wiring and testing techniques.
- **32509 Instrument Drawings and Documents**
Familiarizes trainees with instrument symbols, abbreviations, and specific types of drawings and documents.
- **32510 Flow, Pressure, Level, and Temperature**
Presents devices used to measure flow, pressure, level, and temperature, along with their principles of operation.
- **32511 Process Control Theory**
Offers a comprehensive introduction to basic components and principles of operation of typical control systems found in industrial settings. Covers most common modes of control and their advantages and disadvantages. Applications are reviewed to reinforce understanding of fundamentals and major types of controls, individual components, and their roles in typical control loops.
- **32512 Precision Measuring Tools**
Explains how to select, inspect, use, and care for levels, feeler gauges, calipers, micrometers, height gauges and surface plates, dial indicators, protractors, parallels and gauge blocks, trammels, and pyrometers.
- **32513 Forklifts**
Covers basic operation of rough terrain forklifts with an emphasis on safety.
- **32514 Fiber Optics**
Explains the Theory of Operations of fiber-optic systems, how they are constructed, and the different types of splicing and testing methods used in today's systems.

Who to Contact in Mississippi

For more information on becoming an Industrial Maintenance – Mechanical Technician contact MCEF at 601-605-2989.