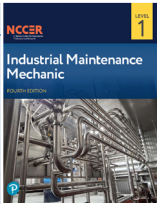


L1 INDUSTRIAL MAINTENANCE MECHANIC

LEVEL 1



Curriculum Notes

- 277.5 Hours (includes Core)
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

PAPERBACK

Trainee Guide: \$74.99

ISBN

978-0-13-538348-3

DIGITAL

NCCERconnect Access Card: \$74.99

ISBN

978-0-13-538361-2

NCCERconnect +

Trainee Guide: \$104.99

978-0-13-538347-6

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Introduction to Industrial Maintenance (5 Hours)

ISBN 978-0-13-539267-6

(Module ID 32101) This module reviews career choices available to skilled industrial craftworkers. Industrial maintenance mechanics who perform their tasks safely, communicate effectively, and behave responsibly earn respect within the industry, and pave the way for career growth, increased pay, and better advancement opportunities.

Millwright Hand Tools (17.5 Hours)

ISBN 978-0-13-765387-4

(Module ID 15102) Introduces hand tools used by millwrights. Explains hand tool safety and covers the methods for selecting, inspecting, using, and maintaining these tools.

Millwright Power Tools (22.5 Hours)

ISBN 978-0-13-765440-6

(Module ID 15205) Introduces power tools used by millwrights and procedures for using, caring for, and maintaining these tools.

Fasteners and Anchors (12.5 Hours)

ISBN 978-0-13-765394-2

(Module ID 15103) Identifies fasteners and anchors used by millwrights, including their applications and installation procedures.

Oxyfuel Cutting (17.5 Hours)

ISBN 978-0-13-418268-1

(Module ID 29102) Explains the safety requirements for oxyfuel cutting. Identifies oxyfuel cutting equipment and provides instructions for setting up, lighting, and using the equipment.

Gaskets and Packing (15 Hours)

ISBN 978-0-13-765450-5

(Module ID 15107) Describes gaskets and packing and their applications, while also providing instructions for laying out, cutting, and installing gaskets.

Craft-Related Mathematics (20 Hours)

ISBN 978-0-13-765434-5

(Module ID 15201) This module introduces the use of equivalents and conversion tables, figure ratios, and proportions. Explains basic use of trigonometry in calculating takeouts, volumes, and weights of objects, and performing right-angle trigonometry.

Reading Mechanical Drawings (20 Hours)

ISBN 978-0-13-748352-5

(Module ID 15203) Explains orthographic projection, isometric, and schematic drawings used to show piping, hydraulic, and pneumatic systems.

Pumps and Drivers (5 Hours)

ISBN 978-0-13-539264-5

(Module ID 32108) This module introduces common pumps found in commercial and industrial settings and explains how they work to effectively move fluids. It also covers the types of engines that drive the pumps, including basic installation methods.

Identifying and Installing Valves (20 Hours)

ISBN 978-0-13-581131-3

(Module ID 08203) Identifies different types of valves, including those that start and stop flow, regulate flow, regulate flow direction, and relieve pressure, and describes their installation as well as proper storage and handling procedures. Covers common valve operators and actuators.

Electrical Test Equipment (5 Hours)

ISBN 978-0-13-817475-0

(Module ID 26112-23) Covers the applications of various types of electrical test equipment. Describes meter safety precautions and category ratings.

Rigging Practices (15 Hours)

ISBN 978-0-13-498801-6

(Module ID 38102) Describes basic rigging and safety practices related to rigging activities. Teaches use and inspection of equipment and hardware used in rigging. Explains how to apply common hitches.

Motorized Equipment (10 Hours)

ISBN 978-0-13-580999-0

(Module ID 08106) Explains the safety factors, operator maintenance, and operating procedures associated with motorized equipment used on job sites. Covers electrical generators, air compressors, aerial lifts, forklifts, trenchers, backhoes, mobile cranes, and portable equipment including welding machines, pumps, and compactors.

Lubrication (15 Hours)

ISBN 978-0-13-812112-9

(Module ID 15208) Explains how to safely select and use lubricants. Describes types of lubricants and lubrication devices.

L2 INDUSTRIAL MAINTENANCE MECHANIC

LEVEL 2

Curriculum Notes

- 192.5 Hours
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

PAPERBACK

Trainee Guide: \$99.99

ISBN

978-0-13-538721-4

DIGITAL

NCCERconnect Access Card: \$99.99

ISBN

978-0-13-538714-6

NCCERconnect +

Trainee Guide: \$129.99

978-0-13-538723-8

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Basic Layout (20 Hours)

ISBN 978-0-13-765399-7

(Module ID 15104) Discusses the tools used in layout. Explains how to lay out baselines using the arc method and 3-4-5 method.

Piping Systems (5 Hours)

ISBN 978-0-13-581129-0

(Module ID 08201) Introduces chemical, compressed air, fuel oil, steam, and water systems. Explains how to identify piping systems according to color codes, the effects of thermal expansion, and the purpose of pipe insulation.

Basic Copper and Plastic Piping Practices (12.5 Hours)

ISBN 978-0-13-794993-9

(Module ID 03103) Explains how to identify types of copper tubing and fittings used in the HVACR industry and how they are mechanically joined. Introduces push-to-connect and press-to-connect fittings. Also presents the identification and application of various types of plastic piping including PEX tubing, along with their common assembly and installation practices. Introduces pressure testing refrigerant lines.

Basic Carbon Steel Piping Practices (10 Hours)

ISBN 978-0-13-794985-4

(Module ID 03105) Explains how to identify various carbon steel piping materials and fittings. Covers the joining and installation of threaded and grooved carbon steel piping systems, including detailed descriptions of threading and grooving techniques.

Maintaining Valves (10 Hours)

ISBN 978-0-13-748754-7

(Module ID 08408) Explains how to replace packing and O-rings, and how to open and close a valve's bonnet. Discusses how to safely troubleshoot and maintain several types of valves.

Testing Piping Systems and Equipment (20 Hours)

ISBN 978-0-13-748734-9

(Module ID 08309) Discusses the importance of safety and following procedures with testing and inspections. Topics include pretest requirements, visual weld inspections, service flow tests, hard pressure tests, hydrostatic tests, and steam blow tests.

Introduction to Bearings (15 Hours)

ISBN 978-0-13-765463-5

(Module ID 15209) Describes the types and applications of bearings, including plain, roller, ball, thrust, and guide bearings, as well as pillow block, flanged, and takeup bearings. Also explains bearing designation systems.

Introduction to Conveyors (10 Hours)

ISBN 978-0-13-817582-5

(Module ID 15401) Describes conveyor systems and their principles of operation. Introduces several approaches to belt conveyor drive options. Introduces drum motors and servomotors for belt and roller conveyor systems.

Continued on following page

Industrial Maintenance Mechanic Level 2 (continued)

Low-Pressure Steam Systems (10 Hours)

ISBN 978-0-13-539285-0

(Module ID 32208) This module introduces the properties of water and fundamentals of steam, followed by a detailed review of low-pressure steam systems and components. Maintaining these systems includes the repair, monitoring and troubleshooting all the components of these systems, such as boilers, control valves, heat exchangers, condensate traps, and vacuum pumps.

High-Pressure Steam Generation Systems

(20 Hours)

ISBN 978-0-13-539287-4

(Module ID 32209) This module explains the functioning of high-pressure steam systems used in industry. To support a boiler operation, maintenance craftworkers must be proficient in the use, repair, and maintenance of the auxiliary equipment needed to generate and manage high pressure steam, such as pulverizers, evaporators, soot blowers, and precipitators.

Distillation Towers and Vessels (20 Hours)

ISBN 978-0-13-539288-1

(Module ID 32210) Introduces the various types and functioning of distillation towers and vessels, including recovery vessels and condensate processing. The operation, maintenance, and repair of distillation towers and vessels is described in this module. Various types of towers and their components are discussed, as well as an overview of refinery processes.

Industrial Heat Transfer Equipment (30 Hours)

ISBN 978-0-13-539290-4

(Module ID 32211) This module reviews the fundamental principles behind heat transfer. It explores uses of heat transfer within numerous industries and outlines the different types of heat exchange equipment. By reviewing the module, the maintenance craftworker is prepared to maintain heat exchange equipment safely, knowledgeable in its operation, servicing, and uses.

Introduction to Tube Work (10 Hours)

ISBN 978-0-13-539291-1

(Module ID 32212) Introduces the basics of working with heat exchanger and furnace tubing and tube sheets. By employing a detailed boiler inspection program and applying the proper tools and techniques, forced outages and downtime can be reduced and boiler efficiency can be restored.

L3 INDUSTRIAL MAINTENANCE MECHANIC

LEVEL 3

Curriculum Notes

- 210 Hours
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

PAPERBACK

ISBN

Trainee Guide: \$99.99

978-0-13-538171-7

DIGITAL

ISBN

NCCERconnect Access Card: \$99.99

978-0-13-538188-5

NCCERconnect +

Trainee Guide: \$129.99

978-0-13-538178-6

MODULES

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Advanced Pipefitting Math (25 Hours)

ISBN 978-0-13-583245-5

(Module ID 08304) Covers the role of trigonometry in pipefitting, including the use of trigonometric functions, triangle calculations, determining angles, interpolation, and calculating takeouts and odd angles.

Precision Measuring Tools (20 Hours)

ISBN 978-0-13-765435-2

(Module ID 15302) Explains how to select, inspect, use, and care for measuring tools of the millwright craft. Now includes tools such as keyseat rules, telescoping gauges, ultrasonic thickness detector and hardness tester.

Removing and Installing Bearings (22.5 Hours)

ISBN 978-0-13-765464-2

(Module ID 15306) Explains how to remove, troubleshoot, and install tapered, thrust, spherical roller, pillow block, and angular contact ball bearings.

Couplings and Alignment Fundamentals (15 Hours)

ISBN 978-0-13-812122-8

(Module ID 15307) Identifies types of couplings and covers installation procedures using the press-fit method and the interference-fit method. Also covers coupling removal procedures.

Setting Baseplates and Soleplates (20 Hours)

ISBN 978-0-13-765441-3

(Module ID 15207) Describes how to set a machine baseplate and soleplate while guaranteeing alignment with other equipment.

Prealignment and Shim Fabrication (20 Hours)

ISBN 978-0-13-812123-5

(Module ID 15313) Covers procedures for fabricating shims. Explains how to level equipment using jack bolts, wedges and shims. Guides the checking for soft foot and other coupling stresses addressed during rough alignment.

Dial Indicator Alignment (45 Hours)

ISBN 978-0-13-812127-3

(Module ID 15314) Explains the procedures involved in aligning shafts, first with a straightedge and feeler gauges, then with dial indicators. Describes preparation for dial indicator reverse alignment, and explains the procedures for setting up reverse alignment jigs. Explains graphic and mathematical techniques for aligning equipment, based on reverse dial indicator measurements.

Installing Belt and Chain Drives (15 Hours)

ISBN 978-0-13-817577-1

(Module ID 15311) Covers the sizes, uses, and installation procedures of six types of drive belts and two types of chain drives.

Mechanical Seals (15 Hours)

ISBN 978-0-13-765453-6

(Module ID 15305) Covers the function and advantages of mechanical seals, identifies parts and types of seals, and includes procedures for removing, inspecting, and installing mechanical seals.

Troubleshooting and Repairing Conveyors

(12.5 Hours)

ISBN 978-0-13-817584-9

(Module ID 15402) Describes maintaining and repairing belt, roller, chain, screw, and pneumatic conveyors. Covers conveyor belt tracking problems and correction methods.

Continued on following page

Curriculum Notes

- 150 Hours
- Revised: 2024, Fourth Edition
- Downloadable instructor resources are available.

PAPERBACK**ISBN**

Trainee Guide: \$99.99

978-0-13-538781-8**DIGITAL****ISBN**

NCCERconnect Access Card: \$99.99

978-0-13-538774-0

NCCERconnect +

Trainee Guide: \$129.99

978-0-13-538766-5**MODULES**

The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Preventive and Predictive Maintenance*(10 Hours)***ISBN 978-0-13-817605-1**

(Module ID 15508) Explains preventive and predictive maintenance programs. Provides information on nondestructive testing, and introduces the basic techniques for nondestructive evaluation. Discusses lubricant analysis, and acoustic, infrared, and vibration testing.

Advanced Mechanical Drawings *(17.5 Hours)***ISBN 978-0-13-812135-8**

(Module ID 15503) Describes the use of drawing sets to obtain information about a system. Explains the process of identifying a part of a machine for repair or replacement from a set of drawings.

Basic Pneumatic Systems *(7.5 Hours)***ISBN 978-0-13-812105-1**

(Module ID 15407) Explains pneumatic system components and compressed-air treatment. Introduces equipment auxiliary and special-application equipment used with compressors and with tools.

Compressors and Compressor Maintenance*(20 Hours)***ISBN 978-0-13-812110-5**

(Module ID 15406) Introduces compressors and the troubleshooting and maintenance procedures associated with compressors.

Laser Alignment *(25 Hours)***ISBN 978-0-13-817589-4**

(Module ID 15502) Describes the operation of laser alignment instruments. Covers step-by-step vertical and horizontal alignment.

Introduction to Leadership *(22.5 Hours)***ISBN 978-0-13-828931-7**

(Module ID 46100) Introduces leadership skills and different leadership styles, as well as communication and problem solving techniques. Jobsite safety and safety leadership are also discussed. Introduces business topics that are important to understand for construction projects.

Troubleshooting and Repairing Pumps*(17.5 Hours)***ISBN 978-0-13-812118-1**

(Module ID 15405) Describes inspecting, troubleshooting, assembling, and disassembling pumps. Explains installing pumps, and preparing them for startup. Discusses shutdown, repair, and removal of pumps from the system.

Troubleshooting and Repairing Gearboxes*(15 Hours)***ISBN 978-0-13-817596-2**

(Module ID 15411) Explains how to troubleshoot, remove, and disassemble gearboxes; how to identify gear wear patterns; and how to install and maintain gearboxes.

Advanced Towers and Vessels *(15 Hours)***ISBN 978-0-13-539268-3***(Module ID 32501)*

This module addresses different types of distillation towers and the components found inside them, including the different types of trays and packing used in the distillation process. On the maintenance side, it covers removing, replacing, and troubleshooting tower components, torquing and tensioning, as well as safety when working on distillation towers.