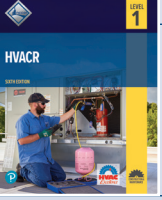



LI HVACR




LEVEL 1



Curriculum Notes

LEVEL 1



Curriculum Notes

- 200 Hours (includes Core)
- Revised: 2022, Sixth Edition, in partnership with HVAC Excellence to provide comprehensive educational resources.
- NATE-Recognized Training Provider
- Downloadable instructor resources are available.
- A Spanish translation of the sixth edition is available. Please see NCCER's online catalog for more information.

PAPERBACK	ISBN
Trainee Guide: \$74.99	978-0-13-794984-7
Trainee Guide + NCCERconnect Access Card \$104.99	978-0-13-799521-9
SPANISH	ISBN
Trainee Guide: \$74.99	978-0-13-817447-7
DIGITAL	ISBN
NCCERconnect Access Card: \$74.99	978-0-13-795006-5
Core + HVACR LI: \$137.98	978-0-13-816916-9

MODULES

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

Introduction to HVACR (5 Hours)

ISBN 978-0-13-794996-0

(Module ID 03101) Covers the basic principles of heating, ventilating, air conditioning, and refrigeration, career opportunities in HVACR, and how apprenticeship programs are constructed. Basic safety principles, trade licensure, EPA guidelines, and the Laws of Thermodynamics are also introduced.

Trade Mathematics (10 Hours)

ISBN 978-0-13-794997-7

(Module ID 03102) Explains how to solve HVACR trade-related problems involving the measurement of lines, area, volume, weights, angles, pressure, vacuum, and temperature. Also includes a review of scientific notation, powers, roots, and basic algebra and geometry.

Basic Electricity (15 Hours)

ISBN 978-0-13-795000-3

(Module ID 03106) Introduces the concept of power generation and distribution, common electrical components, AC and DC circuits, electrical safety as it relates to the HVACR field, and reading and interpreting wiring diagrams.

Introduction to Heating (15 Hours)

ISBN 978-0-13-794987-8

(Module ID 03108) Covers the fundamentals of heating systems and the combustion process. Provides the different types and designs of gas furnaces and their components, as well as basic procedures for their installation and service. Introduces temperature measurement calculations.

Introduction to Cooling (30 Hours)

ISBN 978-0-13-794989-2

(Module ID 03107) Explains the fundamental operating concepts of the refrigeration cycle and introduces common refrigerants. Describes the principles of heat transfer and the essential pressure-temperature relationships of refrigerants. Discusses major components of cooling systems as well as their controls, including temperature switches.

Air Distribution Systems (15 Hours)

ISBN 978-0-13-794992-2

(Module ID 03109) Describes the factors related to air movement and its measurement in common air distribution systems. Presents the required mechanical equipment and materials used to create air distribution systems. Introduces basic system design principles for both hot and cold climates.

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.



NATE CERTIFICATION

NCCER is an officially recognized training provider for North American Technician Excellence (NATE), an independent, third-party certification body for HVACR technicians. NATE-certified technicians can use module completions through NCCER-accredited training providers for the continuing education hours required for recertification through NATE. For details and lists of available NATE-recognized training, visit www.natex.org. For more information regarding NATE recertification, please contact NCCER Customer Service at 1-888-622-3720.

Soldering and Brazing (10 Hours)

ISBN 978-0-13-794994-6


(Module ID 03104) Introduces the equipment, techniques, and materials used to safely join copper tubing through both soldering and brazing. Covers the required personal protective equipment, preparation, and work processes in detail. Also provides the procedures for brazing copper to dissimilar materials.

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.

Continued on following page

L2 HVACR	
	LEVEL 2
Curriculum Notes	
<ul style="list-style-type: none"> • 162.5 Hours • Revised: 2024, Sixth Edition, in partnership with HVAC Excellence to provide comprehensive educational resources. • NATE-Recognized Training Provider • Downloadable instructor resources are available. 	
PAPERBACK	ISBN
Trainee Guide: \$102.99	978-0-13-821016-8
DIGITAL	ISBN
NCCERconnect Access Card: \$102.99	978-0-13-821004-5
Trainee Guide + NCCERconnect Access Card \$129.99	978-0-13-820994-0

MODULES

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

Customer Relations (7.5 Hours)

ISBN 978-0-13-829260-7

(Module ID 03316) Presents the importance of establishing good relations with customers and provides guidance on how to achieve that goal. Focuses on ways for a technician to make a good first impression and describes how to communicate in a positive manner with customers. The elements of a service call and dealing with different types of problem customers are also covered.

Basic Maintenance (20 Hours)

ISBN 978-0-13-829264-5

(Module ID 03215) Covers information related to maintenance-oriented materials, as well as guidelines for the inspection and periodic maintenance of various systems and accessories. Also covers the application of gaskets and seals, as well as the adjustment of different types of belt drives. Includes information on inspection and maintenance requirements for selected equipment.

Fasteners and Hardware (10 Hours)

ISBN 978-0-13-829271-3

(Module ID 03313) Covers a variety of fasteners, hardware, and wiring terminations used in HVAC systems, including the installation of these components.

Alternating Current (12.5 Hours)

ISBN 978-0-13-829272-0

(Module ID 03206) Covers transformers, single-phase and three-phase power distribution, capacitors, the theory and operation of induction motors, and the instruments and techniques used in testing AC circuits and components. Also reviews electrical safety.

Compressors (12.5 Hours)

ISBN 978-0-13-829277-5

(Module ID 03302) Explains operating principles of compressors used in comfort air conditioning and refrigeration systems. Includes installation, service, and repair procedures.

Metering Devices (12.5 Hours)

ISBN 978-0-13-829281-2

(Module ID 03303) Covers the operating principles, applications, installation, and adjustment of fixed and adjustable expansion devices used in air conditioning equipment.

Refrigerants and Oils (15 Hours)

ISBN 978-0-13-829287-4

(Module ID 03301) Covers characteristics and applications of pure and blended refrigerants, and provides extensive coverage of lubricating oils used in refrigeration systems.

Leak Detection, Evacuation, Recovery, and Charging (30 Hours)

ISBN 978-0-13-829289-8

(Module ID 03205) Covers refrigerant handling and equipment servicing procedures for HVAC systems in an environmentally safe manner.

Heat Pumps (20 Hours)

ISBN 978-0-13-829290-4

(Module ID 03211) Covers the principles of reverse cycle heating. Describes the operation of heat pumps and explains how to analyze heat pump control circuits. Includes heat pump installation and service procedures.

Indoor Air Quality (12.5 Hours)

ISBN 978-0-13-829299-7

(Module ID 03403) Defines the issues associated with indoor air quality and its effect on the health and comfort of building occupants. Provides guidelines for performing an IAQ survey and covers the equipment and methods used to monitor and control indoor air quality.

Air Quality Equipment (5 Hours)


ISBN 978-0-13-829301-7

(Module ID 03204) Covers principles, processes, and devices used to control humidity and air cleanliness, as well as devices used to conserve energy in HVAC systems.

Chimneys, Vents, and Flues (5 Hours)

ISBN 978-0-13-829303-1

(Module ID 03202) Covers the principles of venting fossil fuel furnaces and methods for selecting and installing vent systems for gas-fired heating equipment.

L3 HVACR	
LEVEL 3	
Curriculum Notes	
<ul style="list-style-type: none"> • 175 Hours • Revised 2024, Sixth Edition • NATE-Recognized Training Provider • Downloadable instructor resources are available. 	
	
PAPERBACK	ISBN
Trainee Guide: \$102.99	978-013-820974-2
DIGITAL	ISBN
NCCERconnect Access Card: \$102.99	978-013-820964-3
NCCERconnect + Trainee Guide: \$129.99	978-0-13-539376-5

MODULES

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

Control Circuit Troubleshooting (20 Hours)

ISBN 978-013-534663-1

(Module ID 03317) Many problems that occur in HVACR systems are caused by a failure in the control circuits or in the electrical loads they serve. Technicians must understand how various control components function and interpret equipment schematics, wiring diagrams, and other service literature.

Motor Testing and Troubleshooting (12.5 Hours)

ISBN 978-013-534664-8

(Module ID 03318) Motors are the workhorses in HVACR systems. Motors also represent the most significant electrical loads in most systems. As a technician, your ability to test and troubleshoot motors will play a significant role in your success. New technologies such as variable-frequency speed control and electronically commutated motors have improved system performance and efficiency, but these products also require a different approach to testing and troubleshooting.

Troubleshooting Cooling (20 Hours)

ISBN 978-013-534665-5

(Module ID 03210) The refrigerant circuit is a closed-loop system, so identifying the source of a problem is not always easy. Because the operation of a refrigerant circuit is affected by external conditions, it can also be challenging to determine if a problem is inside the system or the result of an external influence.

Troubleshooting Heat Pumps (12.5 Hours)

ISBN 978-013-534666-2

(Module ID 03311) This module reviews the operation of heat pumps and presents methods and procedures for their troubleshooting and repair.

Troubleshooting Gas Heating (12.5 Hours)

ISBN 978-013-534668-6

(Module ID 03209) Gas furnaces have advanced a great deal in the last 25 years in the pursuit of safety and higher efficiency. Today's furnaces are controlled by printed circuit boards that integrate the various safety controls with the operating and ignition controls. HVACR service technicians must understand how to test the various inputs and outputs to identify problems.

Troubleshooting Oil Heating (15 Hours)

ISBN 978-013-534669-3

(Module ID 03310) Oil-fired furnaces and boilers are often used in homes in northern sections of the United States that have limited access to other reliable fuels. Oil-fired heating systems have provided reliable comfort to homes and businesses for many years, and are relatively simple to maintain and repair.

Troubleshooting Accessories (10 Hours)

ISBN 978-013-534670-9

(Module ID 03312) HVAC systems, especially in cold, dry climates, are often equipped with humidifiers to maintain a healthy moisture level indoors. Electronic air cleaners may also be installed in both residential and commercial environments. Economizers, which take advantage of cool outside air to provide free cooling indoors, are common in commercial rooftop systems. Energy and heat recovery ventilators are another important indoor air quality (IAQ) accessory that are applied in both residential and commercial systems.

Sheet Metal Duct Systems (10 Hours)

ISBN 978-013-534672-3

(Module ID 03213) HVAC ductwork can be made of sheet metal or fiberglass ductboard. Because the interior surfaces of sheet metal ducts are smooth, metal offers less resistance to airflow than fiberglass ductboard. However, in most cases, metal duct must be insulated to reduce noise transmission, minimize heat transfer, and prevent condensation.

Introduction to Hydronic Systems (15 Hours)

ISBN 978-013-534673-0

(Module ID 03203) A hydronic system uses water as a medium to provide heating and cooling for comfort or processes. In hydronic comfort-heating systems, water travels from the boiler through pipes to terminal devices where the heat is transferred to the air.

Steam Systems (10 Hours)

ISBN 978-013-534674-7

(Module ID 03306) Steam has a wide variety of uses in commercial and industrial sectors. It can carry large quantities of stored energy and be applied in comfort heating, process heating, and even power generation.

Fiberglass and Fabric Duct Systems (7.5 Hours)

ISBN 978-013-534676-1

(Module ID 03214) Fiberglass ductboard has been applied successfully in both residential and commercial installations for many years. It is lightweight, easy to handle, and creates a very quiet air distribution system.

Retail Refrigeration System (15 Hours)

ISBN 978-013-534679-2

(Module ID 03304) Retail refrigeration systems are found everywhere. Various refrigerated coolers, freezers, cases, and dispensers are used wherever food and beverages are served. Out of public view, much larger refrigeration systems protect stored products used to replenish the retail systems.

Zoning, Ductless, and Variable Refrigerant Flow Systems (15 Hours)

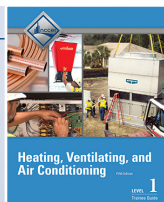
ISBN 978-013-534680-8

(Module ID 03315) Installing a zoning system that distributes air throughout a conditioned space in a more controlled manner makes a standard HVAC system more effective. The popularity of zoning systems has dramatically increased over the years as a result. Ductless systems may be single zone or multizone, with both cooling-only and heat pump systems available. This module describes innovative approaches to comfort and prepares you to install and service the related systems.

Continued on following page

L1 HVAC

LEVEL 1



Curriculum Notes



- 195 Hours (includes Core)
- Updated in 2018.
- NATE-Recognized Training Provider
- Downloadable instructor resources are available.

PAPERBACK

Trainee Guide: \$74.99

ISBN 978-0-13-518509-4

DIGITAL

NCCERconnect Access Card: \$74.99

ISBN 978-0-13-518703-6

NCCERconnect + Trainee Guide: \$104.99

ISBN 978-0-13-539387-1

MODULES

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

Introduction to HVAC (7.5 Hours)

ISBN 978-0-13-545834-1

(Module ID 03101) Covers the basic principles of heating, ventilating, and air conditioning, career opportunities in HVAC, and how apprenticeship programs are constructed. Basic safety principles, as well as trade licensure and EPA guidelines, are also introduced.

Trade Mathematics (10 Hours)

ISBN 978-0-13-545825-9

(Module ID 03102) Explains how to solve HVACR trade-related problems involving the measurement of lines, area, volume, weights, angles, pressure, vacuum, and temperature. Also includes a review of scientific notation, powers, roots, and basic algebra and geometry.

Basic Electricity (12.5 Hours)

ISBN 978-0-13-545837-2

(Module ID 03106) Introduces the concept of power generation and distribution, common electrical components, AC and DC circuits, and electrical safety as it relates to the HVAC field. Introduces reading and interpreting wiring diagrams.

Introduction to Heating (15 Hours)

ISBN 978-0-13-545838-9

(Module ID 03108) Covers the fundamentals of heating systems and the combustion process. Provides the different types and designs of gas furnaces and their components, as well as basic procedures for their installation and service.

Introduction to Cooling (30 Hours)

ISBN 978-0-13-545836-5

(Module ID 03107) Explains the fundamental operating concepts of the refrigeration cycle and identifies both primary and secondary components found in typical HVACR systems. Also introduces common refrigerants. Describes the principles of heat transfer and the essential pressure-temperature relationships of refrigerants. Introduces basic control concepts for simple systems.

Introduction to Air Distribution Systems (15 Hours)

ISBN 978-0-13-545827-3

(Module ID 03109) Describes the factors related to air movement and its measurement in common air distribution systems. Presents the required mechanical equipment and materials used to create air distribution systems. Introduces basic system design principles for both hot and cold climates.



NATE CERTIFICATION

NCCER is an officially recognized training provider for North American Technician Excellence (NATE), an independent, third-party certification body for HVACR technicians. NATE-certified technicians can use module completions through NCCER-accredited training providers for the continuing education hours required for recertification through NATE. For details and lists of available NATE-recognized training, visit www.natex.org. For more information regarding NATE recertification, please contact NCCER Customer Service at 1-888-622-3720.

Basic Copper and Plastic Piping Practices (10 Hours)

ISBN 978-0-13-545832-7

(Module ID 03103) Explains how to identify types of copper tubing and fittings used in the HVACR industry and how they are mechanically joined. Also presents the identification and application of various types of plastic piping, along with their common assembly and installation practices.

Soldering and Brazing (10 Hours)

ISBN 978-0-13-545829-7

(Module ID 03104) Introduces the equipment, techniques, and materials used to safely join copper tubing through both soldering and brazing. Covers the required personal protective equipment, preparation, and work processes in detail. Also provides the procedures for brazing copper to dissimilar materials.

Basic Carbon Steel Piping Practices (10 Hours)

ISBN 978-0-13-545820-0

(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.

L2 HVAC

LEVEL 2

Curriculum Notes

- 175 Hours
- Updated in 2018.
- NATE-Recognized Training Provider
- Downloadable instructor resources are available.



PAPERBACK

Trainee Guide: \$102.99

ISBN 978-0-13-518512-4

DIGITAL

NCCERconnect Access Card: \$102.99

ISBN 978-0-13-518715-9

NCCERconnect +

Trainee Guide: \$129.99

ISBN 978-0-13-539391-8

MODULES

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

Alternating Current (10 Hours)

ISBN 978-0-13-546036-8

(Module ID 03206) Covers transformers, single-phase and three-phase power distribution, capacitors, the theory and operation of induction motors, and the instruments and techniques used in testing AC circuits and components. Also reviews electrical safety.

Compressors (12.5 Hours)

ISBN 978-0-13-546031-3

(Module ID 03302) Explains operating principles of compressors used in comfort air conditioning and refrigeration systems. Includes installation, service, and repair procedures.

Refrigerants and Oils (15 Hours)

ISBN 978-0-13-546027-6

(Module ID 03301) Covers characteristics and applications of pure and blended refrigerants, and provides extensive coverage of lubricating oils used in refrigeration systems.

Leak Detection, Evacuation, Recovery, and Charging (30 Hours)

ISBN 978-0-13-546053-5

(Module ID 03205) Covers refrigerant handling and equipment servicing procedures for HVAC systems in an environmentally safe manner.

Metering Devices (12.5 Hours)

ISBN 978-0-13-546039-9

(Module ID 03303) Covers the operating principles, applications, installation, and adjustment of fixed and adjustable expansion devices used in air conditioning equipment.

Heat Pumps (20 Hours)

ISBN 978-0-13-546026-9

(Module ID 03211) Covers the principles of reverse cycle heating. Describes the operation of heat pumps and explains how to analyze heat pump control circuits. Includes heat pump installation and service procedures.

Continued on following page

HVAC Level 2 (continued)

Basic Maintenance (20 Hours)

ISBN 978-0-13-546054-2

(Module ID 03215) Covers information related to maintenance-oriented materials, as well as guidelines for the inspection and periodic maintenance of various systems and accessories. Also covers the application of gaskets and seals, as well as the adjustment of different types of belt drives. Includes information on inspection and maintenance requirements for selected equipment.

Chimneys, Vents, and Flues (5 Hours)

ISBN 978-0-13-546049-8

(Module ID 03202) Covers the principles of venting fossil fuel furnaces and methods for selecting and installing vent systems for gas-fired heating equipment.

Sheet Metal Duct Systems (10 Hours)

ISBN 978-0-13-546058-0

(Module ID 03213) Covers layout, fabrication, installation, and insulation of sheet metal ductwork. Also includes selection and installation of registers, diffusers, dampers, and other duct accessories.

Fiberglass and Flexible Duct Systems (7.5 Hours)

ISBN 978-0-13-546050-4

(Module ID 03214) Covers the layout, fabrication, installation, and joining of fiberglass ductwork and fittings. Describes the proper methods for attaching and supporting flex duct.

Commercial Airside Systems (12.5 Hours)

ISBN 978-0-13-546046-7

(Module ID 03201) Describes the systems, equipment, and operating sequences commercial airside system configurations such as constant volume single-zone and multi-zone, VVT, VAV, and dual-duct VAV.

Air Quality Equipment (5 Hours)

ISBN 978-0-13-546030-6

(Module ID 03204) Covers principles, processes, and devices used to control humidity and air cleanliness, as well as devices used to conserve energy in HVAC systems.

Introduction to Hydronic Systems (15 Hours)

ISBN 978-0-13-546041-2

(Module ID 03203) Introduces hot water heating systems, focusing on safe operation of the low-pressure boilers and piping systems in residential applications.

L3 HVAC

LEVEL 3

Curriculum Notes

- 167.5 Hours
- Updated in 2018.
- NATE-Recognized Training Provider
- Downloadable instructor resources are available.



PAPERBACK

Trainee Guide: \$99.99

ISBN

978-0-13-518510-0

DIGITAL

NCCERconnect Access Card: \$99.99

NCCERconnect +

Trainee Guide: \$129.99

ISBN

978-0-13-518722-7

978-0-13-539376-5

MODULES

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

Fasteners, Hardware, and Wiring Terminations (10 Hours)

ISBN 978-0-13-546190-7

(Module ID 03313) Covers a variety of fasteners, hardware, and wiring terminations used in HVAC systems including the installation of these components.

Control Circuit and Motor Troubleshooting (30 Hours)

ISBN 978-0-13-546189-1

(Module ID 03314) Provides information and skills to troubleshoot control circuits and electric motors found in heating and cooling equipment.

Troubleshooting Cooling (20 Hours)

ISBN 978-0-13-546179-2

(Module ID 03210) Provides guidance related to troubleshooting cooling systems.

Troubleshooting Heat Pumps (12.5 Hours)

ISBN 978-0-13-546186-0

(Module ID 03311) Provides a thorough review of the heat pump operating cycle, and presents troubleshooting procedures for components.

Troubleshooting Gas Heating (15 Hours)

ISBN 978-0-13-546181-5

(Module ID 03209) Covers information and skills needed to troubleshoot gas-fired furnaces and boilers.

Troubleshooting Oil Heating (15 Hours)

ISBN 978-0-13-546199-0

(Module ID 03310) Describes the construction and operation of oil-fired heating systems and their components. Includes servicing and testing of oil furnaces and procedures for isolating and correcting oil furnace malfunctions.

Troubleshooting Accessories (7.5 Hours)

ISBN 978-0-13-546182-2

(Module ID 03312) Delivers information and skills needed to troubleshoot various air treatment accessories used with heating and cooling equipment.

Zoning, Ductless, and Variable Refrigerant Flow Systems (15 Hours)

ISBN 978-0-13-546191-4

(Module ID 03315) Introduces the information and skills needed to troubleshoot and repair zoned, ductless, and variable refrigerant flow systems.

Commercial Hydronic Systems (12.5 Hours)

ISBN 978-0-13-546194-5

(Module ID 03305) Reviews basic properties of water and describes how water pressure is related to the movement of water through piping systems. Describes various types and components of commercial hot-water heating and chilled-water cooling systems, and examines how those systems function.

Steam Systems (10 Hours)

ISBN 978-0-13-546196-9

(Module ID 03306) Focuses on the use of steam for storing and moving energy in HVAC systems. Reviews the fundamentals of water that relate to steam and describes the basic steam system cycle. Discusses a steam system's operational components—steam boilers and their accessories and controls; steam system loads, including heat exchangers/converters; and terminal devices. Steam system valves and piping are covered in detail, including common types of piping arrangements; the components of a condensate return/feedwater system; steam and condensate pipe sizing; and pressure-reducing valves and thermostatic valves.

Retail Refrigeration System (15 Hours)

ISBN 978-0-13-546187-7


(Module ID 03304) Covers the applications, principles, and troubleshooting of retail refrigeration systems.

Customer Relations (5 Hours)

ISBN 978-0-13-546198-3

(Module ID 03316) Presents the importance of establishing good relations with customers and provides guidance on how to achieve that goal. Focuses on ways for a technician to make a good first impression and describes how to communicate in a positive manner with customers. The elements of a service call and dealing with different types of problem customers are also covered.

Continued on following page

L4 HVAC	
LEVEL 4	
Curriculum Notes	
<ul style="list-style-type: none"> • 157.5 Hours • Updated in 2018. • NATE-Recognized Training Provider • Downloadable instructor resources are available. 	
	
PAPERBACK	ISBN
Trainee Guide: \$102.99	978-0-13-518506-3
DIGITAL	ISBN
NCCERconnect Access Card: \$102.99	978-0-13-518719-7
NCCERconnect + Trainee Guide: \$129.99	978-0-13-539377-2

MODULES

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

Water Treatment (10 Hours)

ISBN 978-0-13-546229-4

(Module ID 03308) Explains water problems encountered in heating and cooling systems and identifies water treatment methods and equipment. Covers basic water testing procedures and chemistry.

Indoor Air Quality (12.5 Hours)

ISBN 978-0-13-546221-8

(Module ID 03403) Defines the issues associated with indoor air quality and its effect on the health and comfort of building occupants. Provides guidelines for performing an IAQ survey and covers the equipment and methods used to monitor and control indoor air quality.

Energy Conservation Equipment (7.5 Hours)

ISBN 978-0-13-546214-0

(Module ID 03404) Covers heat recovery/reclaim devices, as well as other energy recovery equipment used to reduce energy consumption in HVAC systems.

Building Management Systems (12.5 Hours)

ISBN 978-0-13-546220-1

(Module ID 03405) Explains how computers and microprocessors are used to manage zoned HVAC systems. Provides coverage of various network protocols and systems controllers, and introduces trainees to the various means of connection and system interface.

System Air Balancing (15 Hours)

ISBN 978-0-13-546213-3

(Module ID 03402) Covers air properties and gas laws, as well as the use of psychrometric charts. Describes the tools, instruments, and procedures used to balance an air distribution system.

System Startup and Shutdown (15 Hours)

ISBN 978-0-13-546217-1

(Module ID 03406) Presents the procedures for the startup and shutdown of hot water, steam heating, chilled water, and air handling systems. Also covers the start-up and shutdown of typical cooling towers and packaged HVAC units. The procedures for both short- and long-term shutdowns are included.

Construction Drawings and Specifications

(12.5 Hours)

ISBN 978-0-13-546209-6

(Module ID 03401) Teaches how to interpret drawings used in commercial construction, including mechanical drawings, specifications, shop drawings, and as-builts. Explains how to perform takeoff procedures for equipment, fittings, ductwork, and other components.

Heating and Cooling System Design (22.5 Hours)

ISBN 978-0-13-546226-3

(Module ID 03407) Identifies factors that affect heating and cooling loads. Explains the process by which heating and cooling loads are calculated, and how load calculations are used in the selection of heating and cooling equipment. Covers basic types of duct systems and their selection, sizing, and installation requirements.

Commercial/Industrial Refrigeration Systems (20 Hours)

ISBN 978-0-13-546212-6

(Module ID 03408) Expands on the study of product and process refrigeration equipment by describing systems used in cold storage and food processing applications, as well as transportation refrigeration. Various types of defrost systems are covered in detail.

Alternative and Specialized Heating and Cooling Systems (10 Hours)

ISBN 978-0-13-546222-5

(Module ID 03409) Describes alternative devices used to reduce energy consumption, including wood, coal, and pellet-fired systems, waste-oil heaters, geothermal heat pumps, solar heating, in-floor radiant heating, and direct-fired makeup units. Also introduces application-specific computer room environmental and air turnover systems.

Fundamentals of Crew Leadership (22.5 Hours)

ISBN 978-0-13-409855-5

(Module ID 46101) While this module has been designed to assist the recently promoted crew leader, it is beneficial for anyone in management. The course covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Jobsite safety and the crew leader's role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.