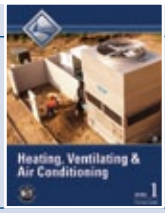
L1 HVAC



LEVEL 1

REVISED!

Curriculum Notes

- 192.5 Hours (Includes 72.5 hours of Core Curriculum which is a prerequisite for Level 1 completion and must be purchased separately. See p. 10 for ordering information.)
- To Be Revised: Summer 2013
- Trainee Guide and individual trainee modules are full color.
- NATE-Recognized Training Provider—see p. 29
- Instructor's Resource Card includes an access code to download detailed lesson plans, module exams, performance profiles and TestGen software.

PAPERBACK	ISBN
Trainee Guide: $65	978-0-13-340253-7
Instructor's Resource Card: $65 (also includes NCCERconnect access)	978-0-13-340382-4

NCCERconnect NEW!

See page 8 for details.

ISBN
Trainee Guide Paperback + Access Card Package: $90 — 978-0-13-340934-5
Access Card ONLY for Trainee Guide: $65 (does not include print book) — 978-0-13-340395-4
ELECTRONIC Access Code ONLY for Trainee Guide: $65 (must be ordered electronically via OASIS; does not include print book) — 978-0-13-340440-1

MODULES

All of the modules listed below are included in the Trainee and Instructor Guide(s) listed above. The following ISBN and pricing information is for ordering individual modules only.

Introduction to HVAC *(7.5 Hours)*
Trainee $19 ISBN 978-0-13-340339-8
Instructor $19 ISBN 978-0-13-340349-7
(Module ID 03101-13) 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)*
Trainee $19 ISBN 978-0-13-340341-1
Instructor $19 ISBN 978-0-13-340350-3
(Module ID 03102-13) Explains how to solve HVAC/R 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)*
Trainee $19 ISBN 978-0-13-340342-8
Instructor $19 ISBN 978-0-13-340351-0
(Module ID 03106-13) 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)*
Trainee $19 ISBN 978-0-13-340343-5
Instructor $19 ISBN 978-0-13-340352-7
(Module ID 03108-13) Covers the fundamentals of heating systems and the combustion process. The different types and designs of gas furnaces and their components, as well as basic procedures for their installation and service, is provided.

Introduction to Cooling *(30 Hours)*
Trainee $19 ISBN 978-0-13-340344-2
Instructor $19 ISBN 978-0-13-340353-4
(Module ID 03107-13) Explains the fundamental operating concepts of the refrigeration cycle and identifies both primary and secondary components found in typical HVAC/R systems. Common refrigerants are introduced as well. Describes the principles of heat transfer and the essential pressure-temperature relationships of refrigerants. Basic control concepts for simple systems are also introduced.

Introduction to Air Distribution Systems *(15 Hours)*
Trainee $19 ISBN 978-0-13-340345-9
Instructor $19 ISBN 978-0-13-340354-1
(Module ID 03109-13) Describes the factors related to air movement and its measurement in common air distribution systems. The required mechanical equipment and materials used to create air distribution systems are also presented. Basic system design principles for both hot and cold climates are introduced.

Basic Copper and Plastic Piping Practices *(10 Hours)*
Trainee $19 ISBN 978-0-13-340346-6
Instructor $19 ISBN 978-0-13-340355-8
(Module ID 03103-13) Explains how to identify types of copper tubing and fittings used in the HVAC/R industry and how they are mechanically joined. The identification and application of various types of plastic piping, along with their common assembly and installation practices, are also presented.

Soldering and Brazing *(10 Hours)*
Trainee $19 ISBN 978-0-13-340347-3
Instructor $19 ISBN 978-0-13-340356-5
(Module ID 03104-13) Introduces the equipment, techniques, and materials used to safely join copper tubing through both soldering and brazing. The required PPE, preparation, and work processes are covered in detail. The procedures for brazing copper to dissimilar materials are also provided.

Basic Carbon Steel Piping Practices *(10 Hours)*
Trainee $19 ISBN 978-0-13-340348-0
Instructor $19 ISBN 978-0-13-340358-9
(Module ID 03105-13) Explains how to identify various carbon steel piping materials and fittings. The joining and installation of threaded and grooved carbon steel piping systems is covered, with detailed coverage of threading and grooving techniques included.

Ordering information for *HVAC Level 1*, Third Edition:

PAPERBACK	ISBN
Trainee Guide: $65	978-0-13-614416-8
Instructor's Guide: $65	978-0-13-614418-2

NCCERconnect	ISBN
Trainee Guide Paperback + Access Card Package: $90	978-0-13-286731-3
IG Paperback + Access Card Package: $65	978-0-13-287888-3
Access Card ONLY for Trainee Guide: $65 (does not include print book)	978-0-13-285973-8
ELECTRONIC Access Code ONLY for Trainee Guide: $65 (must be ordered electronically via OASIS; does not include print book)	978-0-13-292179-4

L2 HVAC

LEVEL 2

Curriculum Notes

- 175 Hours
- Revised: 2007, Third Edition
- Includes full color insert
- NATE-Recognized Training Provider—see p. 29
- Instructor's Guide includes access code to download TestGen software, module exams, and performance profiles from www.nccerirc.com.
- A full-color revision is underway and due in stock late Fall 2013.

PAPERBACK	ISBN
Trainee Guide: $94	978-0-13-614385-7
Instructor's Guide: $94	978-0-13-614387-1

NCCERconnect NEW!

See page 8 for details.

ISBN
Trainee Guide Paperback + Access Card Package: $119 — 978-0-13-286734-4
IG Paperback + Access Card Package: $94 — 978-0-13-286732-0
Access Card ONLY for Trainee Guide: $94 (does not include print book) — 978-0-13-285921-9
ELECTRONIC Access Code ONLY for Trainee Guide: $94 (must be ordered electronically via OASIS; does not include print book) — 978-0-13-292181-7

Product Supplements

PowerPoint® Presentation Slides (in color)
ISBN 978-0-13-602591-7 $40

MODULES

All of the modules listed below are included in the Trainee and Instructor Guide(s) listed above. The following ISBN and pricing information is for ordering individual modules only.

Commercial Airside Systems *(12.5 Hours)*
Trainee $19 ISBN 978-0-13-614558-5
Instructor $19 ISBN 978-0-13-614570-7
(Module ID 03201-07) 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.

Chimneys, Vents, and Flues *(5 Hours)*

Trainee $19 ISBN 978-0-13-614559-2
Instructor $19 ISBN 978-0-13-614571-4
(Module ID 03202-07) Covers the principles of venting fossil-fuel furnaces and methods for selecting and installing vent systems for gas-fired heating equipment.

Introduction to Hydronic Systems *(12.5 Hours)*

Trainee $19 ISBN 978-0-13-614525-7
Instructor $19 ISBN 978-0-13-614572-1
(Module ID 03203-07) Introduces hot water heating systems, focusing on safe operation of the low-pressure boilers and piping systems in residential applications.

Air Quality Equipment *(5 Hours)*

Trainee $19 ISBN 978-0-13-614526-4
Instructor $19 ISBN 978-0-13-614573-8
(Module ID 03204-07) Covers principles, processes, and devices used to control humidity and air clean-lines, as well as devices used to conserve energy in HVAC systems.

Leak Detection, Evacuation, Recovery, and Charging *(20 Hours)*

Trainee $19 ISBN 978-0-13-614527-1
Instructor $19 ISBN 978-0-13-614574-5
(Module ID 03205-07) Covers refrigerant handling and equipment servicing procedures to service HVAC systems in an environmentally safe manner.

Alternating Current *(7.5 Hours)*

Trainee $19 ISBN 978-0-13-614528-8
Instructor $19 ISBN 978-0-13-614575-2
(Module ID 03206-07) 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.

Basic Electronics *(5 Hours)*

Trainee $19 ISBN 978-0-13-614529-5
Instructor $19 ISBN 978-0-13-614576-9
(Module ID 03207-07) Explains the theory of solid-state electronics, as well as the operation, use, and testing of electronic components used in HVAC equipment. Includes an introduction to computers.

Introduction to Control Circuit Troubleshooting *(30 Hours)*

Trainee $19 ISBN 978-0-13-614530-1
Instructor $19 ISBN 978-0-13-614577-6
(Module ID 03208-07) Covers the operation, testing, and adjustment of conventional and electronic thermostats, as well as the operation of common electrical, electronic, and pneumatic circuits used to control HVAC systems. Explains how to analyze circuit diagrams for electronic and microprocessor-based controls used in comfort heating and cooling equipment and how to troubleshoot systems that use these controls.

Troubleshooting Gas Heating *(12.5 Hours)*

Trainee $19 ISBN 978-0-13-614531-8
Instructor $19 ISBN 978-0-13-614578-3
(Module ID 03209-07) Covers tools, instruments, and techniques used in troubleshooting gas heating appliances, including how to isolate and correct faults.

Troubleshooting Cooling *(20 Hours)*

Trainee $19 ISBN 978-0-13-614532-5
Instructor $19 ISBN 978-0-13-614580-6
(Module ID 03210-07) Covers techniques and equipment used in troubleshooting cooling equipment, focusing on analyzing system temperatures and pressures to isolate faults.

Heat Pumps *(15 Hours)*

Trainee $19 ISBN 978-0-13-614533-2
Instructor $19 ISBN 978-0-13-614581-3
(Module ID 03211-07) 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.

Basic Installation and Maintenance Practices *(17.5 Hours)*

Trainee $19 ISBN 978-0-13-614569-1
Instructor $19 ISBN 978-0-13-614582-0
(Module ID 03212-07) Covers the application and installation of fasteners, gaskets, seals, and lubricants, as well as the installation and adjustment of different types of belt drives, bearings, and couplings. Includes information on job documentation and customer relations.

Sheet Metal Duct Systems *(5 Hours)*

Trainee $19 ISBN 978-0-13-604589-2
Instructor $19 ISBN 978-0-13-604591-5
(Module ID 03213-07) 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)*

Trainee $19 ISBN 978-0-13-604590-8
Instructor $19 ISBN 978-0-13-604592-2
(Module ID 03214-07) Covers the layout, fabrication, installation, and joining of fiberglass ductwork and fittings. Describes the proper methods for attaching and supporting flex duct.

Ordering information for *HVAC Level 2*, Fourth Edition, due late Fall 2013:

PAPERBACK	ISBN
Trainee Guide: $94	978-0-13-340427-2
Instructor's Resource Card: $94	978-0-13-340457-9
NCCERconnect	**ISBN**
Trainee Guide Paperback + Access Card Package: $119	978-0-13-340933-8
Access Card ONLY for Trainee Guide: $96 (does not include print book)	978-0-13-340396-1
ELECTRONIC Access Code ONLY for Trainee Guide: $96 (must be ordered electronically via OASIS; does not include print book)	978-0-13-340441-8

NATE CERTIFICATION

NCCER is an officially recognized training provider for North American Technician Excellence (NATE), an independent, third-party certification body for HVAC/R technicians. NATE-certified technicians can use selected 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.

L3 HVAC

LEVEL 3

Curriculum Notes

- 142.5 Hours
- Revised: 2008, Third Edition
- NATE-Recognized Training Provider—see above
- Instructor's Guide includes access code to download TestGen software, module exams, and performance profiles from www.nccerirc.com.
- A full-color revision is underway and due in stock 2014.

PAPERBACK	ISBN
Trainee Guide: $94	978-0-13-604492-5
Instructor's Guide: $94	978-0-13-604493-2
NCCERconnect NEW!	
See page 8 for details.	**ISBN**
Trainee Guide Paperback + Access Card Package: $119	978-0-13-302974-1
IG Paperback + Access Card Package: $94	978-0-13-302975-8
Access Card ONLY for Trainee Guide: $94 (does not include print book)	978-0-13-299461-3
ELECTRONIC Access Code ONLY for Trainee Guide: $94 (must be ordered electronically via OASIS; does not include print book)	978-0-13-302218-6

Product Supplements

PowerPoint® Presentation Slides (in color)
ISBN 978-0-13-605579-2 $40

MODULES

All of the modules listed below are included in the Trainee and Instructor Guide(s) listed above. The following ISBN and pricing information is for ordering individual modules only.

Refrigerants and Oils *(10 Hours)*

Trainee $19 ISBN 978-0-13-604593-9
Instructor $19 ISBN 978-0-13-604642-4
(Module ID 03301-08) Covers characteristics and applications of pure and blended refrigerants, and provides extensive coverage of lubricating oils used in refrigeration systems.

Compressors *(15 Hours)*
Trainee $19 ISBN 978-0-13-604630-1
Instructor $19 ISBN 978-0-13-604643-1
(Module ID 03302-08) Explains operating principles of compressors used in comfort air conditioning and refrigeration systems. Includes installation, service, and repair procedures.

Metering Devices *(7.5 Hours)*
Trainee $19 ISBN 978-0-13-604631-8
Instructor $19 ISBN 978-0-13-604644-8
(Module ID 03303-08) Covers the operating principles, applications, installation, and adjustment of fixed and adjustable expansion devices used in air conditioning equipment.

Retail Refrigeration Systems *(20 Hours)*
Trainee $19 ISBN 978-0-13-604632-5
Instructor $19 ISBN 978-0-13-604646-2
(Module ID 03304-08) Introduces product refrigeration components and systems, including reach-in coolers and freezers.

Commercial Hydronic Systems *(12.5 Hours)*
Trainee $19 ISBN 978-0-13-604633-2
Instructor $19 ISBN 978-0-13-604647-9
(Module ID 03305-08) Describes the boilers, components, and piping systems used in commercial heating applications, and introduces chilled water systems and their components.

Steam Systems *(10 Hours)*
Trainee $19 ISBN 978-0-13-604634-9
Instructor $19 ISBN 978-0-13-604648-6
(Module ID 03306-08) Covers operating principles, piping systems, components, and preventive maintenance requirements of steam systems and steam traps.

Planned Maintenance *(20 Hours)*
Trainee $19 ISBN 978-0-13-604635-6
Instructor $19 ISBN 978-0-13-604649-3
(Module ID 03307-08) Describes the purpose of planned maintenance and outlines procedures for servicing gas and oil furnaces, electric heating equipment, cooling equipment, and heat pumps.

Water Treatment *(10 Hours)*
Trainee $19 ISBN 978-0-13-604636-3
Instructor $19 ISBN 978-0-13-604650-9
(Module ID 03308-08) Explains water problems encountered in heating and cooling systems and identifies water treatment methods and equipment.

Troubleshooting Electronic Controls *(7.5 Hours)*
Trainee $19 ISBN 978-0-13-604638-7
Instructor $19 ISBN 978-0-13-604651-6
(Module ID 03309-08) Explains how to analyze circuit diagrams for electronic and microprocessor-based controls used in comfort heating and cooling equipment and how to troubleshoot systems that use these controls.

Troubleshooting Oil Heating *(10 Hours)*
Trainee $19 ISBN 978-0-13-604639-4
Instructor $19 ISBN 978-0-13-604652-3
(Module ID 03310-08) Explains how to identify the common causes of problems in oil furnaces and offers hands-on experience in isolating and correcting oil furnace malfunctions.

Troubleshooting Heat Pumps *(10 Hours)*
Trainee $19 ISBN 978-0-13-604640-0
Instructor $19 ISBN 978-0-13-604654-7
(Module ID 03311-08) Reviews heat pump operation and heat pump control circuits, including how to isolate and correct faults in the heating, cooling, auxiliary heat, and defrost functions of heat pumps.

Troubleshooting Accessories *(10 Hours)*
Trainee $19 ISBN 978-0-13-604641-7
Instructor $19 ISBN 978-0-13-604620-2
(Module ID 03312-08) Provides hands-on lab sessions on how to troubleshoot humidifiers, electronic air cleaners, economizers, zone controls, and heat recovery ventilators.

L4 HVAC

LEVEL 4

Curriculum Notes

- 180 Hours
- Revised: 2009, Third Edition
- NATE-Recognized Training Provider – see p. 29
- Instructor's Guide includes access code to download TestGen software, module exams, and performance profiles from www.nccerirc.com.

PAPERBACK	ISBN
Trainee Guide: $94	978-0-13-604494-9
Instructor's Guide: $94	978-0-13-604495-6

NCCERconnect NEW!
See page 8 for details.

ISBN
Trainee Guide Paperback + Access Card Package: $119 — 978-0-13-302976-5
IG Paperback + Access Card Package: $94 — 978-0-13-302978-9
Access Card ONLY for Trainee Guide: $94 (does not include print book) — 978-0-13-299463-7
ELECTRONIC Access Code ONLY for Trainee Guide: $94 (must be ordered electronically via OASIS; does not include print book) — 978-0-13-302220-9

Product Supplements

PowerPoint® Presentation Slides (in color)
ISBN 978-0-13-610665-4 $40

MODULES
All of the modules listed below are included in the Trainee and Instructor Guide(s) listed above. The following ISBN and pricing information is for ordering individual modules only.

Construction Drawings and Specifications *(25 Hours)*
Trainee $19 ISBN 978-0-13-609103-5
Instructor $19 ISBN 978-0-13-609151-6
(Module ID 03401-09) 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.

System Balancing *(20 Hours)*
Trainee $19 ISBN 978-0-13-609104-2
Instructor $19 ISBN 978-0-13-609152-3
(Module ID 03402-09) Covers air properties and gas laws, as well as the use of psychrometric charts. Describes tools, instruments, and methods used in balancing an air distribution system.

Indoor Air Quality *(15 Hours)*
Trainee $19 ISBN 978-0-13-609105-9
Instructor $19 ISBN 978-0-13-609153-0
(Module ID 03403-09) 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 *(10 Hours)*
Trainee $19 ISBN 978-0-13-609106-6
Instructor $19 ISBN 978-0-13-609154-7
(Module ID 03404-09) Covers heat recovery/reclaim devices, as well as other energy recovery equipment used to reduce energy consumption in HVAC systems.

Building Management Systems *(17.5 Hours)*
Trainee $19 ISBN 978-0-13-609108-0
Instructor $19 ISBN 978-0-13-609155-4
(Module ID 03405-09) Explains how computers and microprocessors are used to manage zoned HVAC systems. Includes updates reflecting new system architecture, advances in network protocols and systems controllers, and communication via Internet and wireless.

System Startup and Shutdown *(22.5 Hours)*
Trainee $19 ISBN 978-0-13-609144-8
Instructor $19 ISBN 978-0-13-609156-1
(Module ID 03406-09) Covers procedures for the startup of hot water, steam heating, chilled water, and forced-air distribution systems. after initial equipment installation or after an extended period of shutdown. Includes procedures for preparing these systems for extended shutdown.

Heating and Cooling System Design *(25 Hours)*
Trainee $19 ISBN 978-0-13-609145-5
Instructor $19 ISBN 978-0-13-609158-5
(Module ID 03407-09) 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 types of duct systems and their selection, sizing, and installation requirements.

Commercial and Industrial Refrigeration Systems *(22.5 Hours)*
Trainee $19 ISBN 978-0-13-609146-2
Instructor $19 ISBN 978-0-13-609159-2
(Module ID 03408-09) Expands on the study of product and process refrigeration by describing systems used in cold storage and food processing facilities, as well as transportation refrigeration.

Alternative Heating and Cooling Systems

(10 Hours)

Trainee $19 **ISBN 978-0-13-609148-6**
Instructor $19 **ISBN 978-0-13-609161-5**

(Module ID 03409-09) 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.

Introduction to Supervisory Skills *(12.5 Hours)*

Trainee $19 **ISBN 978-0-13-609150-9**
Instructor $19 **ISBN 978-0-13-609162-2**

(Module ID 03410-09) Introduces human resource criteria, concepts, and skills for the craftsperson desiring to advance to leadership roles.

GREEN TOPICS IN HVAC

In the typical American household, heating, cooling and lighting consumes 67% of all the electricity that's generated. With buildings being the leading source of greenhouse emissions, it is no surprise that HVAC systems have become primary targets in this energy conservation battle. In these four modules, we explore the methods and opportunities for increasing the efficiency of energy use and the quality of air that we breathe. This curriculum has been approved for 40 general continuing education hours under GBCI's Credential Maintenance Program.

GBCI CMP

SPIRAL BOUND

Trainee Guide: $65 **ISBN 978-0-13-611998-2**
Instructor's Guide: $65 **ISBN 978-0-13-611999-9**

MODULES

Air Quality Equipment	03204-07
Indoor Air Quality	03403-09
Energy Conservation Equipment	03404-09
Alternative Heating and Cooling Systems	03409-09