



[www.hvacredu.net](http://www.hvacredu.net)

## MASTER CATALOG

Revised February 16, 2012



HVACRedu.net is an ANSI Accredited Program Certificate Issuer for the online 4 year HVAC Apprenticeship Related Training Program; HVACRedu.net has earned Programmatic Accreditation from HVAC Excellence for everything in the catalog, and has earned Quality Matters course recognition from Maryland Online. In addition, all the technical courses are both NATE and BPI recognized for initial certification preparation and continuing education units. HVACRedu.net also won the 2011 Dealer Design Awards Gold in the Contractor Services category for the high quality online courses included in this catalog. Our Mission is quality education, student success, and exceptional customer service.

All the quality online educational courses described here are perfect for your busy schedule. You can study at your own pace at any time of the day or night, on any Internet connected computer anywhere without having to travel to a classroom. Our offerings are listed below by category: Assessments, Courses, Individual Modules, Contractor Business Courses, Special Purpose Courses, Review Courses, Certification Exam Prep Reviews, and Certificate Programs. Enroll by visiting our online Campus Store at <http://main.hvacstore.net/>. Or, just click the highlighted title below for pricing and to enroll. We accept Visa/MasterCard and PayPal.

## Assessments



### Technical Core Assessment (TCA)

If you're not sure where to start, or if you don't know what you should study first, start with this online assessment of your current knowledge. The Technical Core Assessment will indicate your strengths and weaknesses in 19 different knowledge areas of HVACR and Building Performance; and your results indicate your readiness for industry certification exams such as HVAC Excellence, NATE, or BPI. The Assessment is actually 19 separate assessments given in a sequence starting with (1) 30 question exam on safety followed with (18) separate 20 question exams. The questions for each exam are randomly selected from a pool of qualified questions for that knowledge area. Registration for the TCA does not require you to take all of the assessments. You can take only those that are important to you, or you can take all of them. You'll receive an email with your results and a Personal Education Plan (PEP) shortly after you complete the assessments. Your performance on the assessments will determine the structure of your PEP--our recommended list of reviews and courses that, when completed, will bring your knowledge up to the industry standards for excellence. This is a great way to assess your knowledge. Or, if you're a manager or supervisor, it is a great way to establish a training plan for new hires or your existing technicians. Allow about 30 minutes for each exam, and plan to finish them all within 30 days after your enrollment. The knowledge areas covered are:

- HVACR Safety
  - Safety Assessment (Core) - 30 Questions
- HVACR Electrical
  - Electrical 1 Assessment (Core)- 20 Questions
  - Electrical 2 Assessment (Core) - 20 Questions
  - Electrical 3 Assessment (Core)- 20 Questions
  - Electrical 4 Assessment (Core) - 20 Questions

- HVACR Comfort Physics
  - HVAC Physics Assessment (Core) - 20 Questions
  - HVAC Air Properties Assessment (Core) - 20 Questions
- HVACR Comfort Cooling
  - Refrigeration Cycle Assessment (Core) – 20 Questions
  - Economizer Assessment – 20 Questions
  - Refrigeration Cycle Service & Maintenance Assessment - 20 Questions
  - Air Conditioning Troubleshooting Assessment - 20 Questions
- HVACR Comfort Heating
  - Comfort Oil Heating Assessment - 20 Questions
  - Comfort Gas Heating Assessment - 20 Questions
  - Comfort Hydronic Heating Assessment - 20 Questions
  - Comfort Heat Pump Specific Assessment - 20 Questions
- HVACR System Load Calculations
  - Systems Load Calculations Assessment - 20 Questions
- HVACR Air Distribution
  - Air Distribution Assessment – 20 Questions
- Building Science
  - Building Science Assessment – 20 Questions
- Home Performance
  - Home Performance Assessment – 20 Questions

### **Courses** – *Foundation, Intermediate, Advanced, Green*

Courses are open-entry, self-paced, open-exit (unless described otherwise). You have access to each course for 60 days (unless stated otherwise). Spend as much time as needed on a certain page or subject or move along more quickly. Most courses include instructor support unless described “without a mentor”. If the course or program you select does not come with a mentor, you can “add a mentor” for a small additional fee. If you have questions for the instructor, just send an e-mail and you will have an answer within 24 hours. Our course learning modules cover specific HVACR concepts by incorporating a presentation that utilizes some or all of the following: text reading assignments, web site tours, applied exercises, online quizzes, industry terminology definitions, video clips, animations, images and downloadable/printable handouts. Each module concludes with a 20 question module specific exam and the course concludes with a 25 question comprehensive final exam. Students are required to earn a minimum passing score of 75% overall for successful completion and complete the online End of Course Survey before a Certificate of Completion will be issued.

All courses are aligned with the National Standards for HVACR education and the Home Performance industry as dictated by numerous industry groups such as ANSI/ACCA Quality Standards, AHRI, BPI, PAHRA, PHCC, RSES, and others. Each course is recognized for NATE Continuing Education Hours and BPI Continuing Education Units applicable to NATE and BPI re-certification (see each course description). Courses may also qualify for state and local re-licensure CEH's, and for state teaching certification renewal CEU's (check with your local agency for details and contact us if you need assistance).

### **Individual Modules**

To help busy people save time and still acquire focused information, we've also made available all the individual learning modules that make up the courses shown in this catalog. Learning Modules are the building blocks of all our online courses, very much like chapters in a book, with about three hours of online instruction each. Now you have a choice to either study the whole book (online course) or just the chapter (individual module) you're most interested in. You can even mix and match modules to create a learning experience that meets your individual needs. All this adds up to using your valuable time more effectively.

Each module is made up of the same course content, learning resources, pictures, graphics, simulations, charts, tables, and animations included with the full course. Also available is an instructor who can answer any questions you may have via email, if you choose that option. You will have 30 days enrollment to study the online module and complete the online exam. As soon as you submit the exam you'll receive immediate feedback with your score. If you score 75% or higher you can print your own official certificate of completion showing NATE and BPI recognized continuing education hours.

## **Certificate Programs**

Programs are made up of a series of topic-appropriate modules or courses to meet specific learning needs. Programs are described near the back of this catalog. The modules or courses included in each program are described in more detail under the "Courses" section.

## **Courses** – *Foundation, Intermediate, Advanced, Green*

### **101 HVACR Fundamentals** (18 hours/60 days)

*Foundation*

*Written by Chris Compton*

This online course provides an introduction to the HVACR basic fundamentals and terminology. The content of the course is dedicated to applied physics concepts that are utilized in HVACR systems. Subjects include topics on measurements, heat, pressure, gas properties, and air properties. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Introduction to the Industry
- Measurements
- Heat energy
- Pressure
- Gas Works
- Air Works

### **102 HVACR Safety** (18 hours/60 days)

*Foundation*

*Written by Chris Compton*

This online course covers the basic safety considerations of the HVACR workplace. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Presentations and coursework are in six modules that cover:

- Labels, Materials Safety Data Sheets, and Safety Training
- Personal Protective Equipment (PPE)
- Personal Safety in Confined Space and on Ladders
- Fire Extinguishers and Compressed Gasses
- Electrical Lockout / Tagout
- Back Safety, Scaffolds/Lifts, and Fall Protection

### **103 HVACR Basic Sheet Metal** (18 hours/60 days)

*Foundation*

*Written by Mark Clemons*

This course is designed to assist HVAC Technicians and others involved in the HVAC industry with a basic understanding of sheet metal. Sheet metal work is essential to HVAC work. An HVAC tech doing a furnace change out, for instance, will need to fit the new furnace to the plenum which may involve designing or building an adapter. The idea of taking a flat piece of metal and forming it into something useful, functional or decorative can be one of the most fascinating aspects of HVAC work. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). The main topics for the course are:

- Types of Sheet Metal and Their Uses
- Assembling, Connecting, and Fastening Sheet Metal Components
- Sheet Metal Tools and Their Uses
- Sealing, Insulating and Lining Sheet Metal Ductwork
- Specifications, Symbols, and Codes
- Introduction to Sheet Metal Duct Layout and Fabrication
- Methods of Layout and Development

### **104 Copper Works** (6 hours/60 days)

*Foundation*

*Written by Chris Compton*

Copper Works is different from all our other online courses because it was designed to provide specific guidance for students in a Copper Lab. It is rich with images and streaming videos that deliver the course content. There are no exams and therefore we cannot provide a certificate of completion for this course. However, if you are a technician who wants to improve your copper working skills without going to a classroom, this course is right for

you. This course is BPI recognized for 3 continuing education units (CEUs). Copper Works course contains six learning modules covering:

- Copper Tubing/Pipe and Fittings
- Cutting, Flaring, Swaging & Bending Tubing
- Torch Safety and Operation
- Soft Solder
- Silphos Braze
- Silver Braze

**107 Principles of Building Science** (28 hours/90 days)

*Green*

*Written by a group of subject matter experts*

This is the first online course of its kind. It was developed and written in partnership with nationally recognized building science experts and is full of scientific facts, interactive exercises, pictures, videos, graphics, and text. Everything an individual in the building, remodeling, or trade industry needs to know to make buildings perform more efficiently. The PBS course has also been designed to help prepare individuals on the path to various NATE, NARI, BPI, RESNET, and other industry credentials related to green building performance. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. Students receive a downloadable reference book that is provided as a study guide for the course. This course is BPI recognized for 14 hours of continuing education and NATE recognized for 28 hours (CEU's/CEHs) applicable to re-certification. This course allows 90 days enrollment to complete. The Principles of Building Science course contains nine learning modules covering:

- House as a System
- Air Flow Basics
- Heat Flow, Insulation & Windows
- Framing & Air Sealing
- Moisture Management
- Conditioning Strategies
- Ventilation
- Combustion Safety
- Indoor Air Quality Basics

**111 HVACR Electrical DC Theory Plus** (18 hours/60 days)

*Foundation*

*Written by Chris Compton*

This online course is an introduction to basic electrical theory such as the electron, Ohms Law, circuit schematic symbols, circuit characteristics and measurements as applied to DC & AC circuits in the HVACR industry. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This online course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Introduction to the Industry
- What is Energy
- Atomic Theory
- Basic Circuits
- Parallel Circuits
- Power

**112 HVACR Electrical AC Theory Plus** (18 hours/60 days)

*Intermediate*

*Written by Chris Compton*

An online continuation of the Electrical 111 course, concepts presented and discussed are oriented towards alternating current production and application to devices utilized in HVACR systems. We will cover magnetism, alternating current, two types of loads, capacitors, and values of load devices and their calculations, and transformers. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Magnetism
- Alternating current

- Loads, Resistive and Inductive
- Capacitors
- Resistance
- Transformers

**113 HVACR Electrical Common Components** (18 hours/60 days)

*Advanced*

*Written by Chris Compton*

This online course covers common control components found in HVACR systems, a logical continuation of the 112 course. Presentations and examples are given for specific devices and their electrical sequence of operation in normal HVACR applications. The final modules discuss wiring and schematic reading. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). The six modules cover:

- Control Methods, Temperature & Pressure
- Residential Heat / Cool Thermostats @ Low Voltage
- Really Good Relay Stuff
- Contractors go / Starters go with protection
- Power wiring
- Odds and ends around a schematic

**114 HVACR Electrical Motors** (18 hours/60 days)

*Advanced*

*Written by Bob Recko*

This online course is dedicated to common single-phase and small three-phase electric motors. Presentations focus on basic motor theory, common types of motors, starting components and protection devices. We will also develop diagnostic skills for motor troubleshooting and replacement. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Basic Electric Motor Theory
- Open and Hermetic Motors
- Capacitor Motors
- Three-phase Motors
- The Application of Electric Motors
- Diagnosing and Replacing Electric Motors

**121 HVACR Systems Air Properties and Measurement** (18 hours/60 days)

*Intermediate*

*Written by Chris Compton*

This online course is the introduction to HVAC comfort systems. In this course we will discuss heat energy, the conditions of human comfort, the psychrometric chart and plotting various air conditions upon it. We will complete the course by introducing the terms, concepts, measurements, and calculations of moving air. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Heat Energy and Comfort
- Properties of Air
- Psychrometrics
- Total Heat In Air
- Measuring a Heavy Invisible Moving Volume
- Air Flow Measurement

**122 HVACR Systems II, Load Calculations** (18 hours/60 days)

*Advanced*

*Written by Phil Rains*

This online course introduces you to residential load calculations. This is a method to determine the heating and cooling BTU/H loads of structures prior to installing HVACR systems to meet those loads. The required text is the Air Conditioning Contractors of America (ACCA) Manual J, 8<sup>th</sup> Abridged Edition (MJ8-AE). The manual provides thorough instructions for estimating heat loss and heat gain for residential structures and helps to simplify complicated procedures that are often used on a variety of home applications. This course will provide instruction for completing load calculations by hand, which is necessary prior to attempting any computerized load program. We will focus on following the concepts of MJ8-AE while simplifying the methodology emphasized in the manual even further. Students will utilize a “simple” residential structure and follow the steps to calculate both heat loss and heat gain for its location and outdoor design temperatures. This course also covers residential equipment selection focused on the heating and cooling equipment Btu/h loads of a structure. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). This course is presented in the following six modules:

- Fundamentals of Load Calculations
- Heat Loss of a Structure
- Heat Gain of a Structure
- Example Heat Loss and Heat Gain Calculation
- Fundamentals of Equipment Selection
- Regional Load Calculation Exercises

### **123 HVACR Air Distribution** (18 hours/60 days)

*Advanced*

*Written by Phil Rains*

123 Air Distribution begins with an in-depth discussion of the fundamentals of residential air flow, then turns the focus to residential duct design utilizing the Air Conditioning Contractors of America (ACCA) Residential Duct Systems, Manual D and ACCA Manual T. System selection, system performance characteristics, duct materials, blower performance, air –side devices and duct sizing procedures are covered in detail. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE recertification, and BPI recognized for 9 continuing education units (CEUs). Module topics are:

- Fundamentals of Air Flow
- Air distribution Systems
- Fundamentals of Air Conditioning Contractors of America (ACCA) Residential Duct Systems, Manual D
- Application of Air Conditioning Contractors of America (ACCA) Residential Duct Systems, Manual D Duct Sizing Procedures
- Application of Air Conditioning Contractors of America (ACCA) Air Distribution Basics for Residential and Small Commercial Buildings, Manual T
- Selection and Sizing of Supply Air Outlets and Return Air Inlets using the ACCA Manual T and Air Distribution Equipment Manufacturer Performance Data for an Example Residential Structure

### **131 HVACR Oil Heat I** (18 hours/60 days)

*Intermediate*

*Written by Bob Recko*

This online course is designed to introduce the concept of combustion in basic terms. The focus will be on the current direct-vent systems and the traditional high-pressure gun burner. It will prepare technicians to install, maintain, and repair residential and small commercial burner systems up to 400,000 BTUs/hour. We will explore all the mechanical, electrical, and accessory devices commonly found in the modern fuel oil heating systems. With this knowledge, we will build troubleshooting skills and identify applicable codes as they pertain to the installation and use of these systems. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Characteristics of Fuel Oil and Principles of Combustion
- Types and Construction of Oil Burners
- Oil Burner Anatomy (part one)
- Oil Burner Anatomy (part two)
- Fuel Oil Tanks and Piping
- Complete Heating Systems

### **132 HVACR Oil Heat II** (18 hours/60 days)

*Advanced*

*Written by Bob Recko*

This course is a continuation Of Oil 131 which covered the basic concepts of Oil Heat. In this course we will offer a review of Basic Electrical Principles that are needed for a technician to effectively diagnose electrical problems in Oil Heat Systems as well as other electrical subjects such as operating, safety and primary controls. Oil tank installation concerns, especially code requirements will be studied. NFPA 31 will be referenced along with the equivalent local code from where a student may live and work. The annual tune up and combustion efficiency will also be part of this course. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- The Oil Burner Circuit
- Control Wiring and Operational Safety Controls
- Primary Controls
- Oil Tank Installation
- The Annual Tune Up
- Combustion Efficiency Testing

### **133 HVACR Gas Heat I** (18 hours/60 days)

*Intermediate*

*Written by Bob Recko*

This course will provide knowledge and skills towards becoming a highly skilled technician who will install, maintain, and repair residential and small commercial Gas Heat Systems. We will explore all the mechanical, electrical, and accessory devices commonly found in the modern Gas Heating Systems. With this knowledge, we will build troubleshooting skills and identify applicable codes as they pertain to the installation and use of these systems. Also extremely important is the focus on safety for the technician, the building, and its occupants. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Six modules cover:

- Fuel Gas Composition
- Pressure Regulators, Burners, and Heat Exchangers
- Standing Pilot Systems
- Electronic Ignition
- High Efficiency Furnaces
- Troubleshooting Gas Burner Systems

### **135 HVACR Heat Pump / Air to Air** (21 hours/60 days)

*Intermediate*

*Written by Phil Rains*

This course is designed as an introduction to reverse-cycle heat pumps used in residential and light commercial applications. Content covers the components and operational differences of a heat pump vs. a straight air conditioning system; and components, troubleshooting, and solutions. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 21 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 10.5 continuing education units (CEUs).

Modules cover:

- What is a Heat Pump
- Heat Pump Installation and Quality Criteria
- The Heat Pump Cooling Mode
- The Heat Pump Heating Mode
- The Heat Pump Defrost Mode
- Heat Pump Components
- Heat Pump Troubleshooting

### **137 HVACR Geothermal Heat Pump Systems** (18 hours/60 days)

*Intermediate*

*Written by Phil Rains*

You will gain an introduction to geothermal heat pumps as one of the most efficient heating and cooling technologies available today. The course will focus on geothermal (water source) heat pumps utilized for

residential and light commercial applications. A prerequisite to this course is a good understanding of the refrigeration cycle. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Modules cover:

- Introduction to Geothermal Heat Pumps
- Geothermal Heat Pump Mechanics
- Ground-Water (Open-Loop) Systems
- Closed-Loop Systems
- Equipment Selection Criteria and Economics
- Installation Setup, Startup, and Troubleshooting

#### **141 HVACR Refrigeration I** (18 hours/60 days)

*Intermediate*

*Written by Chris Compton*

HVACR Refrigeration 141 is designed to provide a thorough examination of the refrigerant circuit as it is applied to both air conditioning and refrigeration purposes, and to provide a practical and systematic method to diagnose problems in the refrigerant circuit. If you understand the parameters governing the operation of the refrigerant circuit, you will be able to diagnose any piece of equipment. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs).

Modules cover:

- Basic Refrigeration Cycle Physics
- Condensation and Condensers
- Expansion and Metering Devices
- Evaporation and Evaporators
- Compression and Compressors
- Measure the Normal Cycle

#### **142 HVACR Refrigeration II** (18 hours/60 days)

*Advanced*

*Written by Chris Compton*

This course is a continuation and elaboration of HVACR Refrigeration 1. Presentations will describe the application of common accessories found in a system, piping arrangements, sizing considerations and system operation. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Modules cover:

- Refrigerants
- Compressor accessories and applications
- Low side accessories and applications
- High side accessories and applications
- Piping system sizing and applications
- Capacity control methods

#### **151 Building Automation Systems I** (18 hours/60 days)

*Intermediate*

*Written by Bob Recko*

A good understanding of common HVAC systems is a prerequisite for this course. Building controls are very different from the typical controls found in most residential and commercial systems and equipment. Technicians should have a sense of what a building complex consists of, what control systems consist of, what control requirements need to be met and what choices are available in building design to meet the needs of the building. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. The Honeywell Engineering Manual is included in this course as a downloadable file. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Module topics are:

- Building and HVAC Systems
- Air Circulation and Air Quality
- Control System Characteristics
- Process Characteristics and Control Systems

- Control System Components
- Control System Categories

### **152 Building Automation Systems II** (18 hours/60 days)

*Advanced*

*Written by Bob Recko*

This course is an introduction to the primary concepts that lead to the dominant building controls systems, DDC and all its variants including Energy Management. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Module topics are:

- Psychrometrics
- Pneumatic Control Basics
- Pneumatic Controls
- Electric Controls
- Electronic Controls Fundamentals
- Microprocessor Based/DDC

### **153 Building Automation Systems DDC Networking I** (18 hours/60 days)

*Advanced*

*Written by Chris Hickman*

This course is designed to introduce HVACR Technicians, and others involved in the HVACR industry, to basic networking concepts and terminology. This course will help those desiring to work in the building automation field, to establish a strong foundation of standard network terminology and concepts. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs).

The main topics for the course are identified below:

- Introduction to Networks
- OSI and Other Network Models
- Taking It From the Topology
- Stringing It All Together
- Transporting Data
- Network Addressing

### **154 Building Automation Systems DDC Networking II** (18 hours/60 days)

*Advanced*

*Written by Chris Hickman*

This course is designed to introduce HVACR Technicians, and others involved in the HVACR industry to Direct Digital Controls networking types, concepts, and terminology. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). The main topics for the course are identified below:

- Control Drawings
- DDC Controller Fundamentals
- DDC Systems Architecture
- BACnet
- Open Systems and LonWorks Platform
- Specifications

### **155 Building Automation Systems GUI Points** (18 hours/60 days)

*Advanced*

*Written by Chris Hickman*

This course is designed to introduce HVACR Technicians, and others involved in the HVACR industry, to the common types of interfaces used with DDC networks. The most common web based interface will be simulated and used by the student. Basic energy management strategies for several HVAC systems are also covered. The students will use a Graphic User Interface (GUI) and control drawings to identify hardware and software points on common commercial HVAC equipment. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to

NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). The main topics for the course are identified below:

- Operator Interface Methods
- Scheduling
- Chilled Water System Controls
- Condenser Water Controls
- Hot Water System Controls
- Air Handling Units Controls

**156 Building Automation Systems Basic DDC Programming** (18 hours/60 days)

*Advanced*

*Written by Chris Hickman*

This course is designed to introduce HVACR Technicians and others involved in the HVACR industry to the fundamentals of programming logic. The students will learn about logic flow diagrams, and some of the different types of programming found in the industry. The student will also study the programming logic of the systems covered in 155. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). The main topics for the course are identified below:

- Basic Programming Logic 1
- Basic Programming Logic 2
- Chilled Water Systems Programming
- Condenser Water Systems Programming
- Hot Water Systems Programming
- Air Handling Programming

**161 HVACR Boilers I** (18 hours/60 days)

*Intermediate*

*Written by Ken Donovan*

This course is designed to introduce the concepts and terminology of heating and power boilers. The main focus of the course will be on commercial and industrial boilers. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Modules cover:

- Boiler Fundamentals
- Classifying Boilers
- Combustion
- The Heat Exchanger
- Controlling energy Sources
- Boiler Accidents/Hazards

**171 HVACR Boilers Low Pressure License Prep** (30 hours/90 days)

*Intermediate*

*Written by Ken Donovan and Keith Conrod*

This online course is designed to introduce the concepts and terminology of heating and power boilers. The main focus of the course will be on commercial and industrial boilers. The content covers the required knowledge for proper and safe low pressure boiler system operations. Individual Mentored students are enrolled for a 90 day term. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 28 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 15 continuing education units (CEUs). The content is covered in the 9 modules outlined below:

- Introduction to the industry
- Classifying Boilers
- Combustion
- The Heat Exchanger
- Controlling Energy Sources
- Boiler Accidents / Hazards
- Pumps
- Heat Transfer Units
- System Accessories

**186 Economizer** (Certificate Course – 12 hours/30 days)

*Advanced*

*Written by Chris Hickman and Bruce Aitken*

HVAC Economizer systems are an often misunderstood, yet essential component of successful energy efficiency and air comfort / quality strategies in commercial building applications. The goal of this course is to provide the working field technician and HVAC student with an understanding of the importance of correctly installed and operating economizers; what they are, how they work, and how the service technician can maintain, troubleshoot and insure the correct operation of these systems. This course is NATE recognized for 12 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 6 continuing education units (CEUs). The learning modules included in this course are:

- Introduction to Economizers
- Economizer Operations
- Applied Economizers

**191 HVACR Hydronics I** (18 hours/60 days)

*Intermediate*

*Written by Keith Conrod*

This is the initial course on hydronic heating systems. This online course begins a series of courses that address hot water heating systems. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Module topics covered:

- System concept
- Materials and Tools
- Boilers
- Pumps
- Heat Transfer Units
- System Accessories

**221 Indoor Air Quality Basics** (18 hours/60 days)

*Foundation*

*Written by John Kreiger and Chris Doris*

You already know it is your job to provide services related to the comfort of air temperatures inside your client's buildings. However, temperature management is not the only thing you need to know. This course will help you better understand the various elements of air quality, introduce the science of air quality, and give you some tips on how to identify and address the potential dangers of poor indoor air quality. The course does not address issues of allergies or chemically sensitive clients outside the basics of indoor air quality. You will learn indoor air properties, air flow, ventilation, moisture, and air filtration systems. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs).

Modules address the following topics:

- IAQ Basics
- Properties of Air
- Air Flow Basics
- Ventilation
- Moisture Management
- Air Filtration

**241 HVACR Intro to Cooling System Troubleshooting** (18 hours/60 days)

*Advanced*

*Written by Phil Rains*

This course is provided to instruct the entry level HVAC technician in the common service procedures performed on conventional residential/light commercial cooling systems including electrical circuits, mechanical compression refrigeration cycle, and necessary components in a cooling system, and more. This course requires a good understanding of the refrigeration cycle before you begin. A prerequisite is to be at least to the knowledge level provided in our 141 HVACR Refrigeration course. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards and includes RSES tutorials. This course is NATE recognized for 18 hours of continuing

education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs).  
Module topics are:

- System Service Overview
- Service Tools/Equipment, Safety, and Quality
- System Components
- System Air Flow
- System Electrical Troubleshooting Basics
- System Mechanical Troubleshooting Basics

### **242 HVACR R-410A Refrigerant Technology for HVACR Technicians** (18 hours/60 days) *Advanced*

*Written by Phil Rains*

This R-410A Qualification course is designed to familiarize the technician with the differences between R-22 and R-410A. Background, regulations, impact on the industry, and application requirements will be presented. The course will also provide the technician with practical knowledge for safe performance of service techniques on systems containing R-410A. If you understand the parameters of this course and successfully complete the exams at the end of each module, you will receive a certificate of completion that complies with many equipment manufacturers' policies requiring safety and service "certification" prior to purchasing equipment containing R-410A refrigerant. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 18 hours of continuing education (CEHs) which are applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). This course has been approved by International Comfort Products, LLC. Six Modules cover:

- R - 410A Refrigerant Background
- R - 410A Refrigerant Regulatory Requirements
- R - 410A Refrigerant Basics
- R - 410A Refrigerant Safety, Handling, and Service Considerations
- R - 410A System Components, Retrofitting, and Charging
- R - 410A System Troubleshooting

### **243 HVACR Advanced Troubleshooting** (21 hours/60 days)

*Advanced*

*Written by Chris Hickman, James Eller, and Phil Rain,*

This comprehensive course will help technicians move through a procedure to follow safety guidelines, identify the source of problems in HVACR systems, use diagnostic tools, and to address the problem properly. Often technicians start their investigation with only the customer's call, "It died yesterday!" Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 21 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 10.5 continuing education units (CEUs). The course is divided into 7 modules covering the topics listed below:

- Electrical Troubleshooting
- Advanced Controls Troubleshooting
- Troubleshooting instrumentation
- Troubleshooting the Air Side of Systems
- Troubleshooting Refrigeration
- Troubleshooting Combustion
- Troubleshooting Hydronics

### **301 Performing the Comprehensive Building Assessment** (40 hours/90 days) *Green Intermediate*

Designed to introduce students to the comprehensive building assessment process, this intermediate course is geared toward conducting visual building inspections, performing diagnostic testing, and determining residential building improvement opportunities in the field; then documenting a home's performance, prioritizing improvements, and preparing a work scope that will guide the homeowners decision making process for making the improvements.

Students will start out learning the systems, tools and techniques commonly encountered during visual observations including evaluation of envelope components, mechanical systems and base loads such as appliances and lighting. They will then step into diagnostic testing learning first how to work safely. Students will learn how to set up and use the blower door for building pressurization/depressurization testing; and how to utilize

the data obtained in making decisions. Students will learn combustion safety testing (including worst case depressurization, draft and spillage testing), and how to test various appliances for CO including: furnaces, boilers, water heaters and other combustion appliances. Students will also learn basic duct diagnostic testing. Finally, students will be taught how to use assessment information and diagnostic results to develop a work scope which can then be presented to a customer. Approximately 10 hours of animations are included in the instruction. This course will refer to the BPI Building Analyst as well as to various industry codes and standards. It helps prepare individuals for BPI Building Analyst Certification and NATE HVAC Efficiency Analyst Certification (Senior Level). Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. This course is NATE recognized for 40 hours of continuing education (CEHs) and BPI recognized for 20 CEU's applicable to re-certification. This course allows 90 days enrollment to complete. Must earn a grade of 75% or higher to obtain CEH recognition.

Performing the Comprehensive Building Assessment course contains learning modules covering:

1. Observation Techniques and Data Collection
2. Exterior & Interior Assessment and Building System Analysis
3. Blower Door and Zonal Pressure Diagnostics, Ventilation Rates
4. Combustion Safety Testing and Analysis
5. Duct Diagnostics
6. Work Scope Development and Customer Relations
7. Intercas Simulation Experience – a comprehensive combustion appliance safety training simulation

Recommended Prerequisites: Students should have taken the Principles of Building Science, Principles of Green Building or a similar course, or have a solid understanding of building science concepts and house-as-a-system prior to enrollment.

## Contractor Business Courses

### 306 Operations Management (18 hours/60 days)

*Advanced*

*Written by Larrie Mendoza and Phil Rains*

As a contractor or operations manager, there are many challenging elements to overseeing your HVACR work flow. It's up to you to establish and follow-through on business practices that make your company profitable. This course will help by addressing the best practices in the primary areas of your company's operations that impact your profit margin. You will learn basic business practices and procedures to help manage the work flow and minimize delays, loss of time, and resources. This course is NATE recognized for 18 hours of continuing education (CEHs) applicable to NATE re-certification, and BPI recognized for 9 continuing education units (CEUs). Module topics are:

1. Industry Paperwork and Recordkeeping
2. Personnel Management and Communications Skills
3. Systems Integration: Design
4. Systems Integration: Installation
5. Materials Management
6. Resource Scheduling and Cost Management Awareness

### 310 Product and Service Pricing for a Profit (15 hours/60 days)

*Foundation*

*Written by Tom Grandy*

This is the first in a new series of Online Courses for Contracting Businesses, developed in collaboration with nationally acclaimed Grandy and Associates. This 15 hour course covers everything a contractor needs to calculate a realistic hourly rate for their installation and service jobs; budgeting and cash flow; equipment replacement costs; field labor costs; material sales; customer response cards; discussion of flat rate pricing; overhead; company matching taxes; fixed and variable overhead; net profit; overhead absorption; break-even rate; markup vs. profit; calculation of hourly rate; overhead cost per hour and an evaluation of the "what if" process. This course is specifically designed to help contractors consider all the costs of running a profitable business and setting their pricing at levels that keep their business going and growing. Module topics are:

1. Budgeting and Cash Flow
2. Equipment and Replacement Costs
3. Field Labor Costs
4. Material Sales – Overhead Costs
5. Net Profit
6. Worksheet Handouts

### 311 Fifteen Things All Successful Companies Have in Common (15 hours/60 days)

*Foundation*

*Written by Tom Grandy*

This is the second in a new series of Online Courses for Contracting Businesses, developed in collaboration with nationally acclaimed Grandy and Associates. This 15 hour course describes in detail what all successful companies have learned; "What it takes to survive and prosper". The five modules in this course cover the 15 important topics that every business must know to make it in the Contracting Industry. This is valuable information that is a 'Must Have' in today's marketplace. Each of the topics provides a fresh insight into how to run a very profitable business. We saved the best for last, which is the section on tax tips --**this section alone will provide enough tax savings to pay for this program.** At the end of each section there is a list of additional resources that can help expand your knowledge of the topic that is being covered. Module topics are:

1. Realistic Labor Rates; Budgeting; Business Plan
2. Marketing Plan; Marketing Tools; Collections Policy
3. Networking; Planning for Growth; Maintenance Agreement Program
4. Company Newsletter; Flat Rate Pricing; Customer Response Cards
5. Customer Service Training; Bank Line of Credit; Tax Minimization Plan

## Special Purpose Courses

### National Environmental Balancing Bureau

#### NEBB-1 NEBB Report Preparation and Writing (3hours/30 days)

This course provides comprehensive instruction concerning the requirements and formats needed to write a NEBB Certified Testing, Adjusting and Balancing (TAB) Report. NEBB Procedural Standards and the usage of NEBB Certified TAB Report forms and formats are discussed in detail. Examples of Certified Report forms are provided along with step by step instructions to teach the student the correct methods involved in the generation of a NEBB Certified Report. Successful completion of this course helps to prepare the student for NEBB Certification. Please note that the student will be provided with two (2) opportunities to take the Final Exam during their enrollment period.

#### NEBB-2 NEBB Report Review and Error finding Course (3hours/30 days)

It is the job of the TAB Certified Professional to control the quality of the TAB work and TAB reports. This course provides comprehensive instruction in the methods and procedures recommended by NEBB to insure an accurate and error free Testing, Adjusting and Balancing (TAB) Report. NEBB Procedural Standards and the usage of NEBB Certified TAB Report forms and formats are discussed in detail. Examples of Certified Report forms are provided along with step by step instructions to teach the student the correct methods involved in the review and error checking of a NEBB Certified Report. Successful completion of this course helps to prepare the student for NEBB Certification. Please note that the student will be provided with two (2) opportunities to take the Final Exam during their enrollment period.

## Review Courses

A review is a rich online course you may move through at your own pace without an instructor. Each Review Course allows 30 days enrollment to review the materials. Assessments can be taken multiple times to gain knowledge competencies and exam practice. However, you do not receive a certificate of completion.

### [050 HVACR Applied Math Review \(15 course hours\)](#)

*Foundation*

*Written by Chris Compton*

A course designed to refresh and exercise common math concepts as applied to the HVACR workplace. This course provides demonstrations and exercises of the four basic math functions; addition, subtraction, multiplication and division. Each of the four functions is exercised using HVACR workplace applications. Each of the four math functions are applied to:

- Whole numbers
- Fractions
- Decimals

### [EPA 608 Refrigerant Usage Certification Prep Review](#)

*Foundation*

*By RSES*

This course is a selection of four learning modules designed to provide all the necessary information for a technician to prepare for the EPA 608 Certification exam. Successful completion of all four modules will prepare technicians for the Universal level. It is rich with visuals, animations, and checkpoint tests to enforce your learning experience. Use the modules as an introduction, or a review just before you take the exam.

Core

Type I

Type II

Type III

## Certification Exam Prep Review

Each review comes with random selection exams that include immediate feedback. With these exams available on demand, you can continually test yourself and improve the areas that you need most. However, you do not receive a certificate of completion. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards.

Online learning tools include:

- \* Downloadable study handouts
- \* User-friendly navigation
- \* Linked resource sites for additional study
- \* 30-day access
- \* Video clips on key points

### Core Certification Review

This online review is designed to prepare technicians for the NATE Core Service Certification exam. The review covers in detail the same main topics as the NATE Core Service:

- \*HVAC Fundamentals
- \*HVAC Air Side Knowledge
- \*HVAC Electrical Knowledge

### Air Conditioning Certification Review

This online review program is designed to prepare technicians for the NATE Air Conditioning Certification exam at the Service level. The review is done in four very comprehensive sections covering:

- \*HVAC Electrical Knowledge
- \*Refrigeration Cycle Knowledge
- \*Air Side Knowledge
- \*Cooling Service Knowledge

### Air to Air Heat Pump Certification Review

This online review is designed to prepare technicians for the NATE Air to Air Heat Pump Service Certification exam at either the Installation or Service level. The review is done in four very comprehensive sections covering:

- \* HVAC Electrical Knowledge
- \* Air Side Knowledge
- \* Refrigeration Cycle Knowledge
- \* Heat Pump Specific Knowledge

### Gas Heating (Air) Certification Review

This online review is designed to prepare technicians for the NATE Gas Heating (Air) Service Certification exam at either the Installation or Service level. The review is done in three very comprehensive sections covering:

- \* HVAC Electrical Knowledge
- \* Gas Heat Specific Knowledge
- \* Air Side Knowledge

### Hydronics Gas Certification Review

This online review is designed to prepare technicians for the NATE Hydronics Gas Service Certification exam at either the Installation or Service level. The review is done in three very comprehensive sections covering:

- \* HVAC Electrical Knowledge
- \*Hydronics Knowledge
- \* Gas Heat Specific Knowledge

### Hydronics Oil Certification Review

This online review is designed to prepare technicians for the NATE Hydronics Oil Service Certification exam at either the Installation or Service level. The review is done in three very comprehensive sections covering:

- \* HVAC Electrical Knowledge
- \*Hydronics Knowledge
- \*Oil Heat Specific Knowledge

### Oil Heating (Air) Certification Review

This online review is designed to prepare technicians for the NATE Oil Heating (Air) Service Certification exam at either the Installation or Service level. The review is done in three very comprehensive sections covering:

- \* HVAC Electrical Knowledge
- \* Oil Heat Specific Knowledge
- \* Air Side Knowledge

## Certificate Programs

### HVACR Apprenticeship Related Training Program

610 (or more) instructional hours

This is the only ANSI Accredited apprenticeship training program in the country AND it's online— convenient quality education. Courses align with the US Department of Labor Apprenticeship Guidelines and HVACRedu.net is a Registered Apprenticeship Training Provider. This online program is the related training/educational component of registered apprenticeship programs. [Note: Employment and on-the-job-training is not included.] Courses include RSES tutorials. Many employers find it a valuable way to provide on-the-job training to new employees whether or not it is part of a registered apprenticeship program. All courses are scheduled and guided by qualified industry experts in a cohort setting. Courses are available on a revolving schedule so students may enter the program at the beginning of any course. We are happy to offer assistance registering your apprenticeship program with our online training in your state, please contact us.

#### Year 1 (150 hours)

Basic Safety (18 hours)  
Basic Construction Math (12 hours)  
Basic Hand and Power Tools (6 hours)  
Intro to Applied Science (24 hours)  
Energy Sources (12 hours)  
Intro to Code (12 hours)  
Customer Service (6 hours)  
Fuel Piping (30 hours)  
Venting (30 hours)



#### Year 2 (150 hours)

Intro to Blueprints (24 hours)  
Appliance Installation (24 hours)  
Heat Loads (24 hours)  
Indoor Air Quality (18 hours)  
Electrical I (24 hours)  
Electrical II (36 hours)

#### Year 3 (156 hours)

Basic AC & Refrigeration (30 hours)  
Systems Air Flow & Duct Sizing (30 hours)  
Introduction to Hydronics (6 hours)  
Introduction to Service (12 hours)  
Basic Controls (36 hours)  
Basic Sheet Metal (42 hours)

Year 4 (156 hours)  
Testing & Air Balance (12 hours)  
Control Strategies (6 hours)  
Advanced Air Conditioning & Heat Pump (42 hours)  
Advanced Service (24 hours)  
Systems Integration (12 hours)  
Code Review (48 hours)  
Project Management (12 hours)

### **Program Learning Objectives:**

#### Year 1

1. The apprentice will demonstrate new knowledge in the subjects of Basic Safety, Basic Math, Hand & Power Tools, Introduction to Applied Science, Energy Sources, Introduction to Code, Customer Service, Fuel Piping and Venting; by earning an overall average score of 75% or higher in the combined year's curriculum.
2. The apprentice will actively participate in the program's discussion forums, as confirmed by the forum logs and discussion grades, by earning an overall average score of 75% or higher in the combined year's curriculum.

#### Year 2

1. The apprentice will demonstrate new knowledge in the subjects of Heat Loads, Indoor Air Quality, Electrical, Blueprints, and Appliance Installation; by earning an overall average score of 75% or higher in the combined year's curriculum.
2. The apprentice will actively participate in the programs discussion forums, as confirmed by the forum logs and discussion grades, by earning an overall average score of 75% or higher in the combined year's curriculum.

#### Year 3

1. The apprentice will demonstrate new knowledge in the subjects of: Basic Sheet Metal, Basic Air Conditioning and Refrigeration, Systems Air and Duct Sizing, Intro to Hydronics, Intro to Service, and Basic Controls; by earning an overall average score of 75% or higher in the combined year's curriculum.
2. The apprentice will actively participate in the programs discussion forums, as confirmed by the forum logs and discussion grades, by earning an overall average score of 75% or higher in the combined year's curriculum.

#### Year 4

1. The apprentice will demonstrate new knowledge in the subjects of: Advanced Service, Systems Integration, Code Review, Project Management, Testing & Air Balance, and Control Strategies; by earning an overall average score of 80% or higher in the combined year's curriculum.
2. The apprentice will actively participate in the programs discussion forums, as confirmed by the forum logs and discussion grades, by earning an overall average score of 80% or higher in the combined year's curriculum.

## HVACR Core Technician Program

**320 (or more) instructional hours**

This program is a nationally recognized Certificate program, offered in partnership with over 1,000 colleges and universities across the country. Enroll through a college near you and all your courses are online. An additional benefit to this program is that our partner colleges can work with students who may qualify for financial and/or military educational benefits. This is a comprehensive HVACR training program encompassing heating, ventilation, air conditioning, and refrigeration. It is specifically structured to enrich the skills of installers and technicians who are:

- Just beginning in the HVACR industry
- Continuing education for upgrading knowledge and skills, or
- Preparing for certifications or licenses (NATE or ICE)

The content presented in each course focuses on learning objectives that have been identified by HVACR industry groups (ARI, NATE, RSES, ACCA, and PAHRA) as key knowledge for an HVACR technician. **The courses making up the HVAC Core Technician Program are:**

1. 101 Fundamentals
2. 102 Safety
3. 111 Electrical DC
4. 112 Electrical AC
5. 113 Electrical Common Components
6. 114 Electrical Motors
7. 121 Systems Air Properties
8. 141 Refrigeration
9. 142 Refrigeration
10. 131 Oil Heat
11. 133 Gas Heat
12. 161 Boilers
13. 191 Hydronics
14. 135 Heat Pumps (Air to Air)
15. 151 Building Automation Systems
16. 122 Systems Load Calculations

For course descriptions, find the corresponding course number at the beginning of this catalog.

The HVACR Technician Essentials Program is a comprehensive online HVACR education program encompassing heating, ventilation, air conditioning, and refrigeration. In addition to the rich selection of basics courses, each technician may choose their last course to be either 103 Basic Sheet Metal, or 191 Hydronics. This flexibility allows the student to focus on knowledge used in their line of work or home geographic area. It is specifically structured to provide a well-rounded introduction of the basic skills of installers and technicians who are:

- Just beginning in the HVACR industry
- Continuing education for upgrading knowledge and skills, or
- Preparing for certifications or outcome exams: HVAC Excellence Work Ready Exams, or NATE Service Core
- Preparing for state license exams that are often coupled with two or more years work experience

The content presented in each course focuses on learning objectives that have been identified by HVACR industry groups (HVAC Excellence, AHRI, NATE, RSES, HARDI, PAHRA, and ACCA) as key knowledge for an HVACR technician. This program is offered completely online. Even though it is self-paced, students receive a 60 day enrollment for each course. Students are registered for one course at a time. Upon successful completion of a course (a score of 75% or higher), students are registered into the next one and receive a certificate of completion. After successful completion of all fourteen courses, students receive a Certificate of Completion for the HVACR Technician Essentials Program. **The courses making up Program are:**

1. 101 Fundamentals
2. 102 Safety
3. 111 Electrical DC Theory Plus
4. 112 Electrical AC Theory Plus
5. 113 Electrical Common Components
6. 114 Electrical Motors
7. 121 Systems Properties & Measurement
8. 141 Refrigeration I
9. 241 Intro to Service
10. R-410A Refrigerant
11. 135 Heat Pumps
12. EPA 608 Refrigerant Usage Review
13. 133 Gas Heat I
14. Option: 103 Basic Sheet Metal OR 191 Hydronics

For course descriptions, find the corresponding course number at the beginning of this catalog.

## HVACR Service Core Program

**160 (or more) instructional hours**

The HVAC Service Core program is a comprehensive online HVACR education program encompassing heating, ventilation, air conditioning, and refrigeration. It is specifically structured to prepare technicians to successfully pass the initial NATE Core Service Exam and to enrich the skills of installers and technicians who are:

- Just beginning in the HVACR industry
- Continuing education for upgrading knowledge and skills, or
- Preparing for certifications or licenses (NATE or ICE)

The content presented in each course focuses on learning objectives that have been identified by HVACR industry groups (ARI, NATE, RSES, ACCA, and PAHRA) as key knowledge for an HVACR technician. This program is offered completely online and consists of one (1) math review and eight (8) courses in a specific educational sequence for the HVAC Service Core Certificate. Even though it is self-paced, students receive a 60 day enrollment for each course. Students are registered for one course at a time. Upon successful completion of a course (a score of 75% or higher), students are registered into the next one and receive a certificate of completion.

After successful completion of the math review and all eight courses students receive a Certificate of Completion for the Service Core Program. **The courses making up the Service Core Program are:**

- R. 050 Applied Math Review
- 1. 101 Fundamentals
- 2. 102 Safety
- 3. 111 Electrical DC Theory Plus
- 4. 112 Electrical AC Theory Plus
- 5. 113 Electrical Common Components
- 6. 114 Electrical Motors
- 7. 121 Systems Properties & Measurement
- 8. 141 Refrigeration I

For course descriptions, find the corresponding course number at the beginning of this catalog.

## Building Automation Systems Program (Controls)

**108 (or more) instructional hours**

The BAS Online Certificate Program provides entry level knowledge for those aspiring to become Direct Digital Controls (DDC) Technicians. It starts with the fundamentals of building controls and then works through general web based DDC networking knowledge. Next, it is on to control drawing fundamentals and a simulated Graphic User Interface (GUI) used to practice troubleshooting and DDC point identification. Finally, students are introduced to some common types of DDC programming. The last two courses of the program allow students to practice applying DDC technology to common pieces of commercial HVAC equipment. Upon successful completion of a course (a score of 75% or higher), students are registered into the next one and receive a certificate of completion.

The Courses making up the Building Automation Systems Certificate Program are:

- 151 Building Automation Systems I
- 152 Building Automation Systems II
- 153 Building Automation Systems DDC Networking I
- 154 Building Automation Systems DDC Networking II
- 155 Building Automation Systems GUI Points
- 156 Building automation Systems Basic DDC Programming

For course descriptions, find the corresponding course number at the beginning of this catalog.

## The BPI Building Analyst Blended Program

The Building Analyst Blended Program includes 68 or more online instructional hours; followed by 8 hours of BPI Field Training; and concludes with BPI proctored Building Analyst Certification Written and Field Exams.

This program is designed for those interested in working toward BPI (Building Performance Institute) Building Analyst Certification. Becoming a BPI Building Analyst can be both expensive and time consuming. Our programs are designed to get you through the process quickly and painlessly. The BPI Building Analyst Blended Program covers everything you need to know to keep your customer's homes functioning at the very peak of performance. BPI Building Analyst Certification is a great way to compliment and increase your company's Energy Saving and Environmental Services for your customers and to open new doors of opportunity in the building performance and energy efficiency industry.

This educational program was created and developed in partnership with nationally recognized building science experts. Instruction aligns with ANSI/ACCA Quality Installation & Maintenance Standards. Your online studies are supported by online instructors who are experts in building performance and who are only an email away.

When you enroll, HVACRedu.net will contact you to set the date for your face-to-face BPI Certification field training, written exam, and field exam in an area near you with Everblue (included in the program enrollment fee). The courses making up the Building Analyst Blended Program are:

- 107 Principles of Building Science Course (28 online instructional hours)
- 301 Performing the Comprehensive Building Assessment (40 online instructional hours)
- BPI Building Analyst Field Training and BPI Testing (12 hours - Live)  
This includes 8 hours of live field training with an instructor in a residential home. The 2-hour BPI proctored Written Exam and the 2-hour BPI proctored Field Exam are also included.

For course descriptions, find the corresponding course number at the beginning of this catalog.

90 days enrollment in each online course. Must obtain a 75% or higher to obtain CEU recognition. Course provides you with a Subject Matter Expert (mentor) to assist with questions and all course materials for the duration of the course. **User name and access will be sent to your email account within 24 hours of purchase**

## [Membership Subscription Program](#)

Now small shops can afford the same high quality education as the industry leaders ONLINE for a very reasonable price. You can access our entire catalog, over 600 hours, of online Assessments, Courses, Continuing Education Units, and Reviews for an entire year (one course at a time, of course). Learn and earn the credentials that prove your technicians are the best. [Click here](#) for the [Membership Subscription Catalog](#) to see everything that is included in this program.

Membership Subscription includes everything you need for a full 12 months at one reasonable price to fit your needs.

1. Pre-Assessment—validate what your technicians already know through an online comprehensive Technical Core Assessment, don't waste time in classes they don't need.
2. We develop a Personal Education Plan that provides a roadmap for each technician's learning program.
3. All our online courses are available 24 hours every day, no waiting for a course to begin, no travel.
4. We assess student learning at the end of each learning module and at the end of each course topic.
5. We provide the employer with participation and progress reports each month, or more often, so you know your investment is well spent.
6. Mile Markers—students earn a Certificate of Completion for each course topic successfully completed at 75% or above.
7. Personal Education Plans track technician progress, showing how much progress has been accomplished, and what remains.
8. When the Personal Education Plan is complete, the technician is fully prepared to take industry certification exams.
9. Technicians may refresh/review just before sitting for exams—online reviews increase their chance for success.
10. Technicians can add more industry certifications by choosing additional online courses from our full catalog.
11. Courses are Asynchronous (available any time).
12. Courses include Audio and Video elements, simulations, handouts, and more.
13. Courses are self-paced, without an instructor, so you can move as quickly as you like.
14. If you want or need an instructor, one can be added to any course for a small fee.
15. New courses are constantly developed to meet and satisfy the educational needs of our ever expanding industry.

Pricing is on the next page.

**One payment for a full year to handle all your technician training needs:**

**How much do you pay?**  
**One payment for a full year to handle all your technician training needs:**  
 (for a full 12 months of online learning)

<b>Number of Techs</b>	<b>Individual price</b>	<b>What you pay</b>
Price for the first individual	\$1,200	\$1,200
2nd Tech	\$100	\$1,300
3rd Tech	\$100	\$1,400
4th Tech	\$100	\$1,500
5th Tech	\$100	\$1,600
6th Tech	\$95	\$1,695
7th Tech	\$95	\$1,790
8th Tech	\$95	\$1,885
9th Tech	\$95	\$1,980
10th Tech	\$95	\$2,075
11th Tech	\$90	\$2,165
12th Tech	\$90	\$2,255
13th Tech	\$90	\$2,345
14th Tech	\$90	\$2,435
15th Tech	\$90	\$2,525
16th Tech	\$85	\$2,610
17th Tech	\$85	\$2,695
18th Tech	\$85	\$2,780
19th Tech	\$85	\$2,865
20th Tech	\$85	\$2,950

**If you have more technicians, please contact us for the best education pricing available.**

**The Rules** This program provides contractors with a great price, and the best online technician education, and there are a few rules.

1. The start date of the one year, 365 day, membership subscription begins on the date payment for the first \$1,200 subscriber is received. The first membership becomes the "Prime Subscriber".
2. Additional technicians may be added to the membership at any time during the membership period, understanding that the subscription expires 365 days after the prime subscriber began.
3. No substitutions. Individual members may not be replaced with new members.
4. All members in your group expire on the same day as the "Prime subscriber's" 365 day term, even those who may have been added at a later date.
5. Each member may enroll in only one course at a time, and must complete it or withdraw before enrollment into another course.
6. The instructions for enrollment into the next course will be emailed to members in the welcome letter.
7. Certificates of Completion are issued to members who earn a score of 75% or higher in a course.
8. There is no cap to the number of courses a member may complete during the membership subscription; each member may complete as many courses as they wish, working at their own pace.
9. Membership Subscription enrollments are not guided by online faculty, however you may add a mentor to any course for a small fee.

## HVACR Wholesale Employee Training (WET) Program

HVACR Wholesale Employee Training Program is a comprehensive online education program designed to provide the knowledge and skills needed by people working in the HVACR Wholesale Distribution Industry. The goal of this program is to increase the Wholesale Employee's basic understanding of the industry and HVACR systems in general, so they can sell, serve, and communicate with their contractor / technician customers more effectively.

The WET Program is comprised of a series of six online course levels. Each course is made up of a selection of individual modules. The content presented in each course focuses on learning objectives that have been identified by HVACR industry groups (HVAC Excellence, AHRI, NATE, RSES, HARDI, PAHRA, ACCA) as key knowledge areas. Several of the modules that compose the courses are supplemented with additional tutorials from RSES and TEEK.

This program is offered completely online 24/7 without a mentor for the convenience of adult learners. If you would like to add a mentor for a small fee to any course level, just send an email to [info@hvacredu.net](mailto:info@hvacredu.net) requesting the details. The program is self-paced allowing students to work through the material as quickly as you would like up to a 90 day maximum enrollment (unless noted otherwise) for each course level. Students are registered into one course level at a time. Upon successful completion of a level (a score of 75% or higher), students are registered into the next one and receive a certificate of completion. After successful completion of all six course levels, students receive a Certificate of Completion for the HVACR Wholesale Employee Training Program. **The Program Outline:**

### WET - 1 Entry Level – HVAC Distribution Employee (28 hours-90 days):

- 101-1: Introduction to the Industry
- SCSL – 101: Introduction to Distribution
- 010-3: Communications and Work Relationships
- SCSL – 204: Principles of Distribution Sales
- SCSL – 205: Quality Processes in Distribution
- 010 – 2: Personal Work Habits
- 306 – 1: Personnel Management and Communications Skills
- SCSL – 301: Manufacturer – Distributor Relationships

### WET - 2 Basic Safety (23 hours-60 days):

- 102 - 1: Labels, MSDS and Training
- 102 – 2: Personal Protective Equipment
- 102 – 3: Personal Safety in Confined Spaces and on Ladders
- 102 – 4: Fire Extinguishers and Compressed Gases
- 102 – 6: Back Safety, Scaffolds, Lifts and Fall Protection

### WET - 3 Technical Fundamentals (30 hours-90 days):

- 101 – 2: Measurements are Important
- 101 – 3: Heat
- 101 – 4: Pressure
- 101 – 5: Gas Works
- 101 – 6: Air Works
- 107 – 2: Principles of Building Science – Air Flow Basics
- 306 – 2: HVACR Design Criteria
- 306 – 3: HVACR Installation

### WET - 4 HVAC Conditioning Introduction (23 hours-90 days):

- 121 - 1: Heat Energy and Comfort
- 121 - 2: Properties of Air
- 141 - 1: Basic Refrigeration Cycle Physics
- 135 - 1: What is a Heat Pump?
- 133 - 5: High Efficiency Furnaces
- 131 - 6: Complete Heating Systems

### WET – 5 HVAC Conditioning II (24 hours-90 days):

- 122 – 1: Fundamentals of Load Calculations

- 123 – 2: Air Distribution Systems
- 142 – 1: Refrigerants
- R – 410A – 3: Refrigerant Basics, R410A.
- 135 – 6: Heat Pump Components
- 142 – 2: Common Compressor Accessories
- 142 – 3: Common High Side Accessories
- 142 – 4: Common Low Side Accessories

**WET – 6** HVAC Electrical Introduction (27 hours-90 days):

- 111 – 2: What is Energy?
- 112 – 4: Capacitors
- 112 – 6: Transformers
- 113 – 1: Control Methods, Temperature, Pressure
- 113 - 2: Residential Heat – Cool Thermostats, Low Voltage
- 113 - 3: Really Good Relay Stuff
- 113 – 4: Contactors Go
- 114 – 1: Basic Electric Motor Theory – Shaded Pole Motors
- 114 – 5: The Application of Electric Motors

If you are a Distribution Company wishing to discuss this program in detail or a customized program, please contact us at: [info@hvacredunet.net](mailto:info@hvacredunet.net) or call 888-655-4822. This is our recommended track of course sections; however the program can be modified to fit the specific needs of the individual HVACR Distribution Company. The recommended procedure is to enroll wholesale employees into one course at a time beginning with WET-1. However, if the employee is already accomplished in his/her job but needs additional training we recommend our TCA (Technical Core Assessment) to identify the appropriate course level to begin. If the results of the TCA indicate the employee is beyond the level of the WET program, we would provide a PEP (Personal Education Plan) which would direct them down a very specific higher level learning track.

## **ANSI Quality Standards Program**

**15 (or more) instructional hours**

This program is provided to instruct the professional HVAC technician in the common service procedures performed on conventional residential/light commercial cooling systems. The Quality Standards program is not appropriate for entry level HVAC but designed for the practiced professional in HVAC. This program has several facets and is intended to identify quality knowledgeable technicians or assist technicians to review and gain quality knowledge. HVAC contractors and technicians qualify their knowledge in four critical areas that support the Quality Installation & Maintenance of residential and light commercial air conditioning and air source heat pump systems: Air Flow, Equipment Sizing, Refrigerant Charging, and Duct Sealing.

There are three distinct parts to the program: Quality Assessment, Quality Review, and Data Base. Begin with the Quality Assessment or a Quality Review course depending on what the Contractor or Technician chooses. Those that choose the exam and fail are invited to use the Quality Review and retest. Those that wish to review before the exam are offered the Quality Review. A public searchable database is provided to utility clients where customers may search for contractors or technicians qualified to perform work for a number of utility rebate programs.

### **Assessment:**

Contractors and Technicians simply sign up to take the 90 minute, 50 question online QA (Quality Assessment). They must answer 75% of the questions correctly in order to pass. If not, the Quality Review Course is available for a 30 day enrollment.

### **Review:**

The Quality Standards Review is considered a device to cover knowledge that was already known but needs to be revisited to accomplish a task. The Quality Review is rich with industry specific information, divided into five learning modules.

- Module 1 reviews the ANSI/ACCA Quality Standards Overview focusing on design, installation, and service
- Module 2 reviews equipment sizing via Manual J 8AE
- Module 3 reviews air properties and measurement
- Module 4 reviews the refrigeration cycle and servicing
- Module 5 reviews duct sealing practices

Each module includes a random selection exam that can be taken over and over without getting the same selection of questions. This allows self testing of the knowledge gained from the review modules and to prepare for the Quality Assessment.

### **Database:**

Once passed, the name of the technician and/or the name of the contractor's company is entered into a database of "Qualified" contractors and technicians. Customers can search the web-based database to view contractors that have been qualified through the program and provide services subsidized by utility rebates.

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### **CONTACT:**

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**POWER YOUR EDUCATION TO THE NEXT LEVEL!**

### Text Books for Courses

Course	Text (All available through Campus Store)
Fundamentals 101 Safety 102 Sheet Metal 103 Electrical 111 Electrical 112 Electrical 113 Electrical 114 Systems 121 & 122 Heating Gas 133 & 134 Heat Pumps 135 Refrigeration 141 & 142  Troubleshooting 241 & 243 Operations Management 306	Delmar: Refrigeration and Air Conditioning Technology, 5 <sup>th</sup> Edition (Hardcover), Whitman, Johnson, Tomczyk, ISBN 1-4018-3765-4 or Delmar: Refrigeration and Air Conditioning Technology, 6 <sup>th</sup> Edition (Hardcover), Whitman, Johnson, Tomczyk, ISBN 13: 9781428319363 or ISBN 10: 1428319360 or AHRI: Fundamentals of HVACR 1 <sup>st</sup> Edition, 2009, Stanfield & Skaves Prentice Hall ISBN: 13:978-0-13-222367-6 & 10:0-13-222367-8
Systems 122 (Required)	ACCA Manual J (AE) Residential Load Calculations 8 <sup>th</sup> Edition, 2003 ISBN 1-892765-28-4
Oil Heat 131 & 132	No textbook required. The NORA Oil Heat Manual is provided in the course as a downloadable file.
BAS 151 & 152	No Textbook Required-Honeywell Manual is provided in the course as a downloadable file
BAS 153, 154, & 155	CISCO Networking for Dummies ISBN 0-7645-1668-X
BAS 156	The Fundamentals of HVAC Direct Digital Control 2 <sup>nd</sup> Edition, 2001 ISBN 097044711-6
Boilers 161 Boilers 171 (Required)	Low Pressure Boilers, 6th Edition, Frederick M. Steingress, Daryl R. Walker ISBN 978-0-8269-4358-3
Hydronics 191	Modern Hydronic Heating 3rd Edition ISBN 13-9780766816374
Apprentice Program Year 1, 2, 3, and 4 (Purchase in year 1 and use the same books throughout the four year program.)	Delmar: Refrigeration and Air Conditioning Technology, 5 <sup>th</sup> Edition (Hardcover), Whitman, Johnson, Tomczyk, ISBN 1-4018-3765-4 or Delmar: Refrigeration and Air Conditioning Technology, 6 <sup>th</sup> Edition (Hardcover), Whitman, Johnson, Tomczyk, ISBN 13: 9781428319363 or ISBN 10: 1428319360 and -International Fuel Gas Codes 2006 ISBN 1580012698 -International Mechanical Codes 2006 ISBN 1580012574 -International Residential Codes 2006 ISBN 1580012531
Principles of Building Science 107 R410-A Refrigerant Technology	No Textbook Required-a reference manual is included with the course
Performing the Comprehensive Building Assessment 301	No Textbook Required
Home Performance Apprenticeship Program (in development)	SRMI: Residential Energy, 4 <sup>th</sup> Edition, Krigger & Dorsi ISBN 978-1-880120-09-5

You may purchase your textbook(s) anywhere you choose, or visit our campus store at [www.main.hvacstore.net](http://www.main.hvacstore.net).