VIRGINIA TECHNICAL ACADEMY

COURSE CATALOG 2024















LEARN. APPLY. THRIVE.

COURSE
CATALOG
2024

TAKE CONTROL OF YOUR FUTURE BY TAKING THE FIRST STEP TOWARDS YOUR CAREER IN THE SKILLED TRADES.

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VIRGINIA TECHNICAL ACADEMY

LEARN.
APPLY.
THRIVE.

Welcome to Virginia Technical Academy!

As the President and CEO of Virginia Technical academy (VTA), I am very excited to welcome you to our training program. I have personally developed the courses in our programs and have taught several of the HVAC, electrical and appliance repair classes for many years to ensure that your experience here at VTA will be meaningful and productive.

Whether you are enrolled in our day or evening courses, you will be challenged to learn and practice skills that will prepare you for your career in your trade. This is not a school for memorization, you will be encouraged to think on your own, and while it may be challenging, our instructors are here to help you through your studies.

Our courses are certified by the National Center for Construction Education and Research (NCCER) and when you complete our programs, you will be in the NCCER national registry where prospective employers can have access and place you in jobs!

Congratulations on deciding to pursue a career in the trades! It is a high demand field, and your future will hold many choices for you!

David Gillespie

President & Founder

CORE
CURRICULUM CC-100 Course

COURSE OUTLINE

HVAC, ELECTRICAL AND PLUMBING PREREQUISITE

DURATION

80 HOURS

THEORY **66%**

PERFORMANCE **34%**

OBJECTIVE OUTLINE OF TRAINING

This course is a prerequisite for the Electrical, Plumbing, and HVAC programs and covers basic jobsite safety, proper use of PPE, introduction to tools, rigging, construction math, materials handling, reading construction drawings, and communication and employability skills.

- **Basic Safety (Construction Site Safety Orientation)**
- **Introduction to Construction Math**
- **Introduction to Hand Tools**
- **Introduction to Power Tools**
- **Introduction to Construction Drawings**
- **Introduction to Basic Rigging**
- **Basic Communication Skills**
- **Basic Employability Skills**
- **Introduction to Material Handling**

The CORE CURRICULUM COURSE is a prerequisite for HVAC, ELECTRICAL, PLUMBING, BUILDING/PROPERTY MAINTENANCE & MAJOR APPLIANCE REPAIR Programs.

HVAC
HV-2101 Course
COURSE OUTLINE

HVAC

DURATION

200 HOURS

OBJECTIVE OUTLINE OF TRAINING

This course covers the basic principles and fundamental operating concepts of heating, ventilating, air conditioning, refrigeration cycles, subcooling and superheat charging methods. The student will learn how to identify types of copper tubing and fittings, use of proper tools and equipment and introduction of common assembly and installation practices. Course also includes hands-on brazing and soldering skills, and EPA certification.

- **Introduction to HVAC**
- **Trade Mathematics**
- **Basic Electricity**
- **Introduction to Heating**
- **Introduction to Cooling**
- **Introduction to Air Distribution Systems**
- **Basic Copper and Plastic Piping Practices**
- **Soldering and Brazing**
- **Basic Carbon Steel Piping Practices**
- **Covers Applicable Codes, and Standards**

THEORY 57%

PERFORMANCE 43%

HVAC
HV-2102 Course
COURSE OUTLINE

HVAC

DURATION

200 HOURS

THEORY
56%

PERFORMANCE
44%

OBJECTIVE OUTLINE OF TRAINING

A more detailed study on the different parts of a working HVAC/R system. Learn the theory and operations of induction motors, compressors, heat pumps, and metering devices. Learn about refrigerant safety and how to handle refrigerants. Includes 410-A Safety Certification Course and Exam.

- Alternating Current
- Compressors
- Refrigerants and Oils
- Leak Detection, Evacuation, Recovery, and Charging
- Metering Devices
- Heat Pumps
- Basic Maintenance
- Chimneys, Vents, and Flues
- Sheet Metal Duct Systems
- Fiberglass and Flexible Duct Systems
- Commercial Airside Systems
- Air Quality Equipment
- Introduction to Hydronic Systems
- Covers Applicable Codes, and Standards

HVAC

HV-2103 Course

COURSE OUTLINE

HVAC

DURATION

200 HOURS

OBJECTIVE OUTLINE OF TRAINING

This course builds on the individual's knowledge of HVAC/R systems to cover troubleshooting on a variety of equipment, such as, control circuits and electric motors, cooling systems, heat pumps, gas and oil furnaces, and commercial refrigeration systems. Course also covers how to build good customer relations.

- Fasteners, Hardware, and Wiring Terminations
- Control Circuit and Motor Troubleshooting
- Troubleshooting Cooling
- Troubleshooting Heat Pumps
- Troubleshooting Gas Heating
- Troubleshooting Oil Heating
- Troubleshooting Accessories
- Zoning, Ductless, and Variable Refrigerant Flow Systems
- Commercial Hydronic Systems
- Fasteners, Hardware, and Wiring Terminations
- Steam Systems
- Retail Refrigeration System
- Customer Relations
- Covers Applicable Codes, and Standard

THEORY 55%

PERFORMANCE 45%

HVAC
HV-2104 Course
COURSE OUTLINE

HVAC

DURATION

200 HOURS

THEORY 50%

PERFORMANCE 50%

OBJECTIVE OUTLINE OF TRAINING

Learn the refinement side of HVAC/R. This course covers indoor air quality, energy conservation equipment, building management systems, air balancing, basic systems design and fundamentals of crew leadership. Includes Preparatory course for International Mechanical Code exam.

- **Water Treatment**
- **Indoor Air Quality**
- **Energy Conservation Equipment**
- **Building Management Systems**
- **System Air Balancing**
- **System Startup and Shutdown**
- **Construction Drawings and Specifications**
- **Heating and Cooling System Design**
- **Commercial/Industrial Refrigeration Systems**
- **Alternative and Specialized Heating and Cooling Systems**
- **Fundamentals of Crew Leadership**
- **Covers Applicable Codes, and Standards**

ELECTRICAL

EL-2101 Course

COURSE OUTLINE

ELECTRICAL

DURATION

200 HOURS

OBJECTIVE OUTLINE OF TRAINING

This course is an introduction to the Electrical Profession, Electrical Theory, safety, tools, math, and materials used in the work. Course also covers an introduction to the National Electrical Code, distribution systems and materials.

- Orientation to the Electrical Trade, and Electrical Safety
- Introduction to Electrical Circuits, and Electrical Theory
- Introduction to the National Electrical Code
- Device Boxes
- Hand Bending
- Raceways and Fittings
- Conductors and Cables
- Basic Electrical and Construction Drawings
- Residential Electrical Services
- Electrical Test Equipment
- Covers Applicable Codes, and Standards

THEORY 57%

PERFORMANCE 43%

ELECTRICAL

EL-2102 Course

COURSE OUTLINE

ELECTRICAL

DURATION

200 HOURS

THEORY 61%

PERFORMANCE 39%

OBJECTIVE OUTLINE OF TRAINING

An introduction to AC/DC circuits and applications, lighting system installations, cableways, and controls systems.

- Alternating Current
- Motors: Theory and Application
- Electric Lighting
- Conduit Bending
- Pull and Junction Boxes
- Conductor Installations
- Cable Tray
- Conductor Terminations and Splices
- Grounding and Bonding
- Circuit Breakers and Fuses
- Control Systems and Fundamental Concepts
- Covers Applicable Codes, and Standards

ELECTRICAL

EL-2103 Course

COURSE OUTLINE

ELECTRICAL

DURATION

200 HOURS

THEORY 61%

PERFORMANCE 39%

OBJECTIVE OUTLINE OF TRAINING

Learn how to calculate loads, distribution systems, and the practical applications of lighting, transformers, motors, motor controls, voice, data, and video. Includes instruction on how to install switchboards and switchgears, types of transformers and the components of commercial electrical services.

- **Load Calculations — Branch and Feeder Circuits Conductor Selection and Calculations**
- **Hazardous Locations**
- **Overcurrent Protection**
- **Distribution Equipment**
- **Transformers**
- **Commercial Electrical Services**
- **Motor Calculations**
- **Voice, Data, and Video**
- **Motor Controls**
- **Covers Applicable Codes, and Standards**
- **Practical Applications of Lighting**

ELECTRICAL

EL-2104 Course

COURSE OUTLINE

ELECTRICAL

DURATION

200 HOURS

THEORY 71%

PERFORMANCE 29%

OBJECTIVE OUTLINE OF TRAINING

This course is designed to introduce the electrician to health care facilities and the reliable electrical systems and adequate backup power vital for the safety of patients. Learn generator load calculations, advanced controls motor operations, medium voltage, and advanced electronics, standby and emergency systems, fire alarm systems, and specialty transformers. Includes Preparatory course for National Electrical Code exam.

- **Load Calculations — Feeders and Services**
- **Health Care Facilities**
- **Standby and Emergency Systems**
- **Basic Electronic Theory**
- **Fire Alarm Systems**
- **Specialty Transformers**
- **Advanced Controls**
- **HVAC Controls**
- **Heat Tracing and Freeze Protection**
- **Motor Operation and Maintenance**
- **Medium-Voltage Terminations/Splices Special Locations**
- **Fundamentals of Crew Leadership**
- **Covers Applicable Codes, and Standards**

PLUMBING

PL-2101 Course

COURSE OUTLINE

PLUMBING

DURATION

200 HOURS

OBJECTIVE OUTLINE OF TRAINING

This course covers the basics of the plumbing trade, including care and use of tools, job safety, identifying different types of piping, fittings, and valves. Learn how to properly measure, cut, thread, join, and hang different types of piping, and how drain systems and water distribution systems work.

- Introduction to the Plumbing Profession
- Plumbing Safety
- Tools of the Plumbing Trade
- Introduction to Plumbing Math
- Introduction to Plumbing Drawings
- Plastic Pipe and Fittings
- Copper Tube and Fittings
- Cast-Iron Pipe and Fittings
- Carbon Steel Pipe and Fittings
- Introduction to Plumbing Fixtures
- Introduction to Drain, Waste, and Vent (DWV) Systems
- Introduction to Water Distribution Systems
- Covers Applicable Codes, and Standards

THEORY 60%

PERFORMANCE 40%

PLUMBING

PL-2102 Course

COURSE OUTLINE

PLUMBING

DURATION

200 HOURS

THEORY 35%

PERFORMANCE 65%

OBJECTIVE OUTLINE OF TRAINING

This course covers advanced math for the trade and includes how to lay out square corners, calculate simple and rolling offsets and offsets on parallel runs of pipe. Also learn how to install and test drain, waste, and vent (DWV) systems, how to read a set of construction drawings, do material takeoffs, install basic plumbing fixtures, and the associated valves, faucets, and components. Introduces techniques for safe handling of fuel gas and oil, proper installation/testing different water heaters.

- **Plumbing Math Two**
- **Reading Commercial Drawings**
- **Structural Penetrations, Insulation, and Fire Stopping**
- **Installing and Testing DWV Piping**
- **Installing Roof, Floor, and Area Drains**
- **Installing and Testing Water Supply Piping**
- **Types of Valves**
- **Installing Fixtures and Valves**
- **Installing Water Heaters**
- **Basic Electricity**
- **Fuel Gas and Fuel Oil Systems**
- **Covers Applicable Codes, and Standards**

PLUMBING

PL-2103 Course

COURSE OUTLINE

PLUMBING

DURATION

0 HOURS

OBJECTIVE OUTLINE OF TRAINING

Learn how to apply math for the trade, size and protect the water supply system, how to disinfect, filter and trouble-shoot water supply problems. Learn types of venting, how to install, diagnose and repair pumps, controls, and sumps in sewage and storm water removal systems. Includes introduction to compressed air systems.

- **Applied Math**
- **Sizing and Protecting the Water Supply System**
- **Potable Water Supply Treatment**
- **Types of Venting**
- **Sizing DWV and Storm Systems**
- **Sewage Pumps and Sump Pumps**
- **Corrosive-Resistant Waste Piping**
- **Compressed Air**
- **Service Plumbing**
- **Covers Applicable Codes, and Standards**

THEORY 53%

PERFORMANCE 47%

PLUMBING
PL-2104 Course
COURSE OUTLINE

PLUMBING

DURATION

200 HOURS

THEORY 70%

PERFORMANCE 30%

OBJECTIVE OUTLINE OF TRAINING

Introduction to concepts and practices essential for competitive, successful plumbing businesses. Covers basic business accounting, project estimating, cost control and task organization. Also covers crew leadership skills, communication, delegating, problem solving, job site safety, project planning and scheduling. Also includes private water supply and waste disposal systems, medical gas, and vacuum systems. Includes Preparatory course for International Plumbing Code exam.

- **Business Principles for Plumbers**
- **Fundamentals of Crew Leadership**
- **Water Pressure Booster and Recirculation Systems**
- **Indirect and Special Waste**
- **Hydronic and Solar Heating Systems**
- **Codes**
- **Private Water Supply Well Systems**
- **Private Waste-Disposal Systems**
- **Swimming Pools and Hot Tubs**
- **Plumbing for Mobile Homes and Travel Trailer Parks**
- **Introduction to Medical Gas and Vacuum Systems**
- **Covers Applicable Codes, and Standards**

BUILDING/PROPERTY MAINTENANCE

MAINTENANCE BM-100 Course

COURSE OUTLINE

BUILDING/PROPERTY MAINTENANCE

DURATION

400 HOURS

OBJECTIVE OUTLINE OF TRAINING

A program that prepares individuals to apply technical knowledge and skills to keep a building functioning, and to service a variety of structures including commercial and industrial buildings and mobile homes. Includes instruction in the basic maintenance and repair skills required to service building systems, such as safety, carpentry, plumbing, major appliances, and other mechanical systems.

- OHSA 10- Construction Safety
- Wall Systems
- Drywall Finishing
- Doors and Door Hardware
- Appliance Repair and Replacement
- Installing Plumbing Fixtures and Valves
- Basic Employability Skills
- Heating and Air Conditioning
- Residential Electrical Services
- Roofing Applications
- Exterior Finishing

THEORY 54%

PERFORMANCE 46%

APPLIANCE REPAIR

Major Appliance | MA-100 Course

COURSE OUTLINE

APPLIANCE REPAIR

DURATION

640 HOURS

OBJECTIVE OUTLINE OF TRAINING

A program that prepares individuals to apply technical knowledge and skills to repair, install, and service major gas, electric, and microwave consumer appliances such as stoves, refrigerators, dryers, water heaters, washers, dishwashers, and commercial units such as ice makers and coffee makers.

- **Intro Module**
- **Electric and Gas Dryers**
- **Automatic Washers Top/Front Load**
- **Electric and Gas Ranges**
- **Dishwashers and Microwaves**
- **Domestic Refrigeration and Air Conditioning**
- **Ancillary Products**
- **Covers Applicable Codes, and Standards**

EXAMS:
7 HOURS

THEORY
53%

PERFORMANCE
47%

REFRIGERATION REPAIR

Light Commercial Refrigeration HV-LC-302 Course

COURSE OUTLINE

APPLIANCE REPAIR

DURATION

120 HOURS

THEORY 53%

PERFORMANCE 47%

OBJECTIVE OUTLINE OF TRAINING

This course is designed to present a working foundation of refrigeration, covers several applications of light commercial walk-in freezers & reach in coolers, ice makers and domestic/commercial refrigerators, plus a basic knowledge of electrical troubleshooting and reading of schematic wiring diagrams.

- **Fundamentals of Refrigeration**
- **Metering Devices**
- **Refrigerant Flow and Components**
- **Ice Machines: Troubleshooting, Charging, Servicing, and Preventive Maintenance**
- **Domestic Refrigerators and Freezers Flaring, Swaging and Brazing Installing Commercial Equipment**
- **Systems Troubleshooting**
- **Commercial Systems Components Diagnosis; Troubleshooting, TXV Valves, and Charging**
- **Servicing Commercial Systems and Perform Preventive Maintenance on Ice Machines**
- **Troubleshooting, Charge Unit, Service Unit, and Preventive Maintenance**
- **LOKRING Certification for Applying Fittings on Refrigeration Systems**

HVAC
HV-201 Course

HVAC TRAINING COURSES

DURATION

80 HOURS

Learn basic skills and troubleshooting for repairing and maintaining HVAC/R systems. This course is designed to present a working foundation of heat pump, air conditioning and refrigeration theory and application. The student will also learn how to properly charge HVAC systems, subcooling and superheat. Course includes EPA 608 certification. Great course for building maintenance personnel.

- **Refrigeration**
- **Tools & Supplies**
- **Tubing & Piping**
- **Equipment & Instruments for Refrigerant Handling & Services**
- **Working with Refrigerant**
- **Basic Electricity**

HVAC
Electrical Controls HV-202 Course

This course is for the HVAC/R technician who wants a better understanding of the electrical components and how they work. Learn about electrical theory and safety. Learn how to read schematics and wiring diagrams and how electrical control devices work. Includes basic trouble-shooting methods. The mastery of this material will reduce downtime and expenses caused by equipment failures and increase the overall efficiency of operations in the facility.

- **Electrical Safety and Theory**
- **The Operational Function of Electrical Control Devices**
- **Interpreting Schematics and Wiring Diagrams**
- **Troubleshooting Methods**

HVAC
HV-203 Course

DURATION

80 HOURS

This course builds on HV-201 and HV-202 and provides a more hands-on experience to the previous two courses. Student will be given numerous projects to gain proficiency with residential air conditioning, air movement distribution and mechanical and electrical troubleshooting. Learn how to change out compressors, how to install systems with load calculations. PRE-REQUISITE: HV-201, HV-202.

- **Residential Air Conditioning**
- **Air Movement Distribution**
- **Ventilation Theory**
- **Mechanical and Electrical Troubleshooting**

HVAC
Hydrocarbons HV-HC-304 Course

DURATION

24 HOURS

This is a two-day course designed to introduce the student to the characteristics of flammable hydrocarbon refrigerants and how to handle and work with them. Includes instruction on Lokring technology with hands-on practice to use mechanical tube connections instead of brazing. Highly recommended for appliance technicians.

Students will participate in both classroom and hands-on training exercises to ensure mastery of the installation and servicing processes associated with LOKRING tube connections.

- **Identify Uses of Hydrocarbons as Refrigerants**
- **Summarize Hydrocarbon Regulations and Standards**
- **Identify Refrigerant Properties and Safety**
- **Explain Servicing Procedures**
- **Summarize Various LOKRING Applications**
- **Assemble LOKRING Tube Connections**

Electrical
EL-201 Course

This 80 hour course is for the DIY homeowner or building maintenance personnel or anyone looking to get the basic skills and knowledge of electrical concepts and techniques. Learn about electrical safety, theory, National Electric Code, and how to install or repair electrical devices and components, and how to properly inspect and test equipment.

DURATION

80 HOURS

Plumbing
PL-201 Course

This 80 hour course covers the basics of the plumbing trade, including care and use of tools, job safety, identifying different types of piping, fittings, and valves. Learn how to properly measure, cut, thread, join, and hang different types of piping, and how drain systems and water distribution systems work. and applicable codes and standards

DURATION

80 HOURS

Intro Module
MA-101 Course

Course includes Osha 10 construction safety which covers a broad spectrum of valuable workplace health and safety topics that will familiarize you with OSHA Construction Standards. Student will learn to describe:

DURATION

80 HOURS

- **Electrical Principles, and Household Wiring**
- **Utilize Electrical Test Equipment and Describe the Laws of Electromagnetism**
- **Identify Electric Motors**
- **Demonstrate Troubleshooting with Wiring Schematics**
- **Describe Solid State Components**
- **Build Power Supplies and Electrical Filter Systems**
- **Describe Sine Wave and Rectification**
- **Overview of Electrical, Mechanical, and Gas Codes as they Apply to Portable Appliances**
- **Covers Applicable Codes, and Standards**

Electric & Gas Dryers MA-102 Course

DURATION

80 HOURS

This training course is designed to provide the skills and knowledge to correctly and efficiently diagnose and repair residential electric and gas dryers. Upon completion of the course students should be able to troubleshoot and trace wiring diagrams, understand the sequence of operation, properly use test equipment, and disassemble and reassemble dryers.

- **Electric and Gas Dryer Installations.**
- **How to Service Dryers**
- **Diagnosis of Dryer Cycles**
- **Troubleshooting and Parts Look-Up**
- **Includes Electrical, Mechanical, and Gas Codes as they Apply to Dryers**
- **Covers Applicable Codes, and Standards**

Automatic Washers Top/Front Load MA-103 Course

DURATION

80 HOURS

This course is an operational overview of all types of washers, it provides basic and advanced washer technology, for both top-load and front load washers.

- **Explains Electric Washer Installation**
- **How to Service Washers.**
- **Diagnosis of Wash Cycles**
- **Repair of Washers**
- **Troubleshooting and Parts Look-Up**
- **Covers Applicable Codes, and Standards**

Electric & Gas Ranges MA-104 Course

This training course is designed to provide the skills and knowledge to correctly and efficiently diagnose and repair residential electric and gas ranges. Upon completion of the course students should be able to trouble-shoot and trace wiring diagrams, understand the sequence of operation, properly use test equipment, and disassemble and reassemble ranges.

DURATION

80 HOURS

- **Explains Electric & Gas Installation**
- **How to Service Ranges**
- **Diagnosis of Ranges**
- **Repair of Ranges**
- **Troubleshooting and Parts Look-Up**
- **Includes Electrical, Mechanical, and Gas Codes as they Apply to Ranges**
- **Covers Applicable Codes, and Standards**

Dishwashers & Microwaves MA-105 Course

This training course is designed to provide the skills and knowledge to correctly and efficiently diagnose and repair residential dishwash-ers and microwaves. Upon completion of the course students should be able to troubleshoot and trace wiring diagrams, under-stand the sequence of operation, properly use test equipment, and disassemble and reassemble dishwashers and microwaves.

DURATION

80 HOURS

- **Explains Electric Dishwasher Installation**
- **How to Service Dishwashers**
- **Diagnosis of Wash Cycles**
- **Describes Microwave Installations**
- **How to Perform Microwave Service**
- **How to Perform Microwave Repairs**
- **Troubleshooting and Parts Look-Up**
- **Covers Applicable Codes and Standards**

Domestic Refrigeration & Portable Air Conditioning MA-106 Course

DURATION

200 HOURS

This training course is designed to provide the skills and knowledge to correctly and efficiently diagnose and repair residential refrigeration and portable air conditioning. Students will be able to describe procedures, job safety, perform procedures, perform repair systems on hydrocarbons systems. Successful students will obtain CFC & Hydrocarbon refrigerant certification.

- **Explains Sealed System Refrigeration, Portable Air Conditioning Principles, and Installations**
- **How to Service Domestic Refrigeration & Portable Air Conditioning**
- **Troubleshooting Electrical Electronics and Defrost System Circuit**
- **Parts Look-Up**
- **Brazing and LOKRING Connectors**
- **Covers Applicable Codes, and Standards**

Ancillary Products MA-107 Course

DURATION

40 HOURS

This training course is designed to provide the skills and knowledge to correctly and efficiently diagnose and repair ancillary products. Students will learn the principles and operations of and be able to perform services on the following:

- **Garbage Disposals**
- **Trash Compactors**
- **Electric Water Heaters**
- **Includes Electrical, Mechanical, and Gas Codes as they Apply to These Appliances**
- **Covers Applicable Codes, and Standards**

Appliance Repair

APPLIANCE REPAIR TRAINING COURSE

This is a five day, 40-hour course designed to present a working foundation of the six standard household appliances: dryers, washing machines, refrigerators, dishwashers, microwaves, and ranges. Additionally, students will gain an understanding of both electrical schematics and wiring diagrams and how to utilize them in troubleshooting equipment.

DURATION

40 HOURS

- **Demonstrate the Proper Use of Electrical Test Equipmen**
- **Identify the Difference Between Wiring Diagrams and Electrical Schematics**
- **Identify Symbols on Wiring Diagrams and Electrical Schematics**
- **Identify Common Electrical and Electronic Components**
- **State the Principles of Operation for the Six Standard Household Appliances**
- **Troubleshoot Three out of the Six Major Appliances**

PROFESSIONAL CERTIFICATION COURSES

CERTIFICATION COURSES

EPA Section 608
Certification Course

DURATION

6 HOURS

This one-day course has a 4-hour lecture portion that prepares you to take the 2-hour exam at the end of class. The lecture covers

- **Core**
- **Type I Appliances**
- **Type II Low and High-Pressure Systems**
- **Type III Chillers and Low-Pressure Systems**

410-A Safety
Certification Course

DURATION

6 HOURS

This course will prepare the individual to take the EPA Universal R-410A certification exam. Includes a preparatory manual, lecture, and the 3-hour exam.

- **Safely Service Systems Containing R-410A and R-407C**
- **R-22 Phase Out**
- **Appropriate Refrigerant and Oil Applications**
- **Service Techniques**
- **Safe Handling of R-410A**

HYDROCARBONS CERTIFICATION

HV-RSES-HC Course

This one-day course has a 4-hour lecture portion that prepares you to take the 2-hour exam at the end of class. The lecture covers:

- **Identify Uses of Hydrocarbons as Refrigerants**
- **Summarize Hydrocarbon Regulations and Standards**
- **Identify Refrigerant Properties and Safety Handling Hydrocarbons**

DURATION

4 HOURS

NCACP Assessment Center

O*NET Framework + NCCER Knowledge & Performance Evaluation

JOURNEY-LEVEL CREDENTIALING

DURATION

16 HOURS

Virginia Technical Academy (VTA) delivers NCCER's National Craft Assessment and Certification Program (NCACP) for experienced craft professionals seeking a nationally recognized credential aligned to U.S. Department of Labor O*NET occupational frameworks.

Using the O*NET job task definitions as the occupational benchmark and NCCER's Knowledge/Performance evaluations as the assessment mechanism, VTA validates the full scope of journey-level competence in:

- Electricians — O*NET 47-2111.00
- HVAC/R Technicians — O*NET 49-9021.01
- Plumbers — O*NET 47-2152.02

The NCACP provides a formal pathway for individuals to earn credentials for skills gained on the job, ensuring their abilities meet nationally recognized performance expectations.

Assessment Structure (16 Total Hours)

1. Knowledge Assessment (2 Hours, Closed Book). A written examination aligned to O*NET occupational knowledge domains and NCCER learning objectives. The exam verifies a candidate's understanding of codes, safety, system theory, schematics, trade math, and craft-specific principles.

2. Performance Assessment (12–14 Hours). A hands-on, field-based evaluation requiring the candidate to independently demonstrate O*NET-defined job tasks using NCCER's standardized performance criteria. Candidates must complete real-world installations, diagnostics, troubleshooting, and system operations consistent with journey-level expectations.

Program Outcomes

Successful candidates will:

- Earn an NCCER Journey-Level Certification
- Be recorded in the NCCER National Registry
- Demonstrate occupational proficiency aligned with O*NET job-task frameworks
- Validate field-acquired skills for employment, advancement, apprenticeship, or licensing
- Strengthen employability and wage progression in high-demand skilled trades
- VTA's NCACP Assessment Center ensures that every credential is backed by O*NET-aligned occupational performance and NCCER-verified trade competence, providing employers and workforce partners with trusted, measurable skill validation.

NCACP Assessment Center

Knowledge & Performance Breakdown

(Assessment Center Reference Sheet – Electrical, Plumbing, HVAC/R)

JOURNEY-LEVEL CREDENTIALING

DURATION

16 HOURS

PA-EL-101

Knowledge Assessment

- Electrical theory, alternating current & trade math
- Blueprints, schematics, one-line diagrams
- Power distribution equipment & overcurrent protection
- Control circuits, motors, automation basics
- Transformers, grounding, bonding
- Conductor types, raceways, cable applications
- NEC, OSHA, and electrical hazard identification
- Job planning, layout, documentation

Performance Assessment

- Install and troubleshoot distribution equipment
- Bend, install, and secure EMT, rigid, tray, and underground raceways
- Terminate cable systems and connect transformers
- Diagnosing motor controls and industrial circuits
- Wire receptacles, lighting, and equipment from take-offs
- Test circuits, identify code violations, verify continuity/load
- Apply NEC/OSHA safety procedures in real-world tasks
- Perform maintenance and equipment repairs

PA-PL-101

Knowledge Assessment

- Trade math (offsets, angles, pipe calculations)
- Piping materials: PVC, copper, cast iron, carbon steel
- DWV systems, venting, and code requirements
- Gas systems and CSST installation/testing
- Fixtures, faucets, drains, water heaters
- Backflow prevention and potable water systems
- Booster pumps, recirculation, sewage/sump pumps
- Hangers, supports, fire stopping, penetrations
- Rigging, OSHA plumbing safety, documentation

Performance Assessment

- Measure, cut, thread, solder, braze, and install piping
- Lay out and fabricate simple & rolling offsets
- Install DWV assemblies and perform testing
- Install gas piping and CSST to manufacturer requirements
- Install fixtures, heaters, pumps, and backflow assemblies
- Diagnose flow, pressure, drain, or component failures
- Repair or replace plumbing system components
- Apply rigging/safety procedures during installations
- Codes, &, OSHA safety

NCACP Assessment Center
Knowledge & Performance Breakdown
(Assessment Center Reference Sheet – Electrical, Plumbing, HVAC/R)

JOURNEY-LEVEL CREDENTIALING

DURATION

16 HOURS

PA-HV-101
Knowledge Assessment

- HVAC/R system theory, psychometrics, and load basics
- Mechanical drawings, refrigerant cycle, system components
- Electrical fundamentals, controls, sensors, and schematics
- Gas-fired systems, venting, combustion air
- Commercial Air Side & Hydronic Systems
- Boilers, pumps, chilled water, piping
- Indoor air quality, filtration, and energy efficiency
- Codes, EPA guidelines, OSHA safety

Performance Assessment

- Install HVAC systems (residential, commercial, industrial)
- Braze, solder, fabricate, and pressure-test piping
- Install gas-fired equipment and venting systems
- Troubleshoot heat pumps, AC, furnaces, and controls
- Diagnose circuit failures using meters & instruments
- Perform refrigerant leak detection, recovery, evacuation & charging
- Conduct HVAC maintenance (coils, blowers, drains, burners)
- Verify airflow, static pressure, temperature, and system performance

INTERNATIONAL MECHANICAL CODE
HV-IMC-301 Course

PREPARATORY COURSES

This course is designed for the HVAC/R technician or contractor and provides an overview of the key provisions of the International Mechanical Code. Learn the basic concepts of fire and life safety as well as the health impact on building occupants and how to prioritize items for inspections. Includes Preparatory exams for International Mechanical Code.

DURATION

30 HOURS
(Each Course)

National Electrical Code
2014 EL-NEC-301 Course

For the electrician or contractor, this course provides an overview of the key provisions of the 2017 NFPA 70/National Electrical Code. Learn the safety requirements and proper installation of electrical equipment and devices, whether it's for new construction or remodeling. Includes Prep exams for National Electrical Code.

International Plumbing Code
PL-IPC-301 Course

This course is for the plumber or contractor and provides an overview of the key provisions in the International Plumbing Code. Includes Prep exams for International Plumbing Code.

DURATION

1 HOUR

Plumbing Code Course
PL-CE-IFCG Course

This is a thorough 1-hour continuing education course for new changes in the 2018 code book to maintain journeyman and or master license.

DURATION

3 HOURS

National Electric Code Course
EL-CE-NEC Course

Course is a Refresher course and review of the changes in the National Electrical Code. The course will review the changes in NEC2017 & 2020 code book.

DURATION

3 HOURS

International Mechanical Code
HV-CE-IMC Course

Course is designed review of new code updates review of the changes in the International Mechanical (IMC) Code 2015 & 2018. The course will review the changes in International Mechanical Code.

DURATION

3 HOURS

International Fuel Gas Code
PL-IFGC-30 Course

Course is designed review of new code updates, review of the changes of International Fuel Gas (GFC) from 2015 to 2018. The course will review the changes to the International Fuel Gas (GFC) Code.

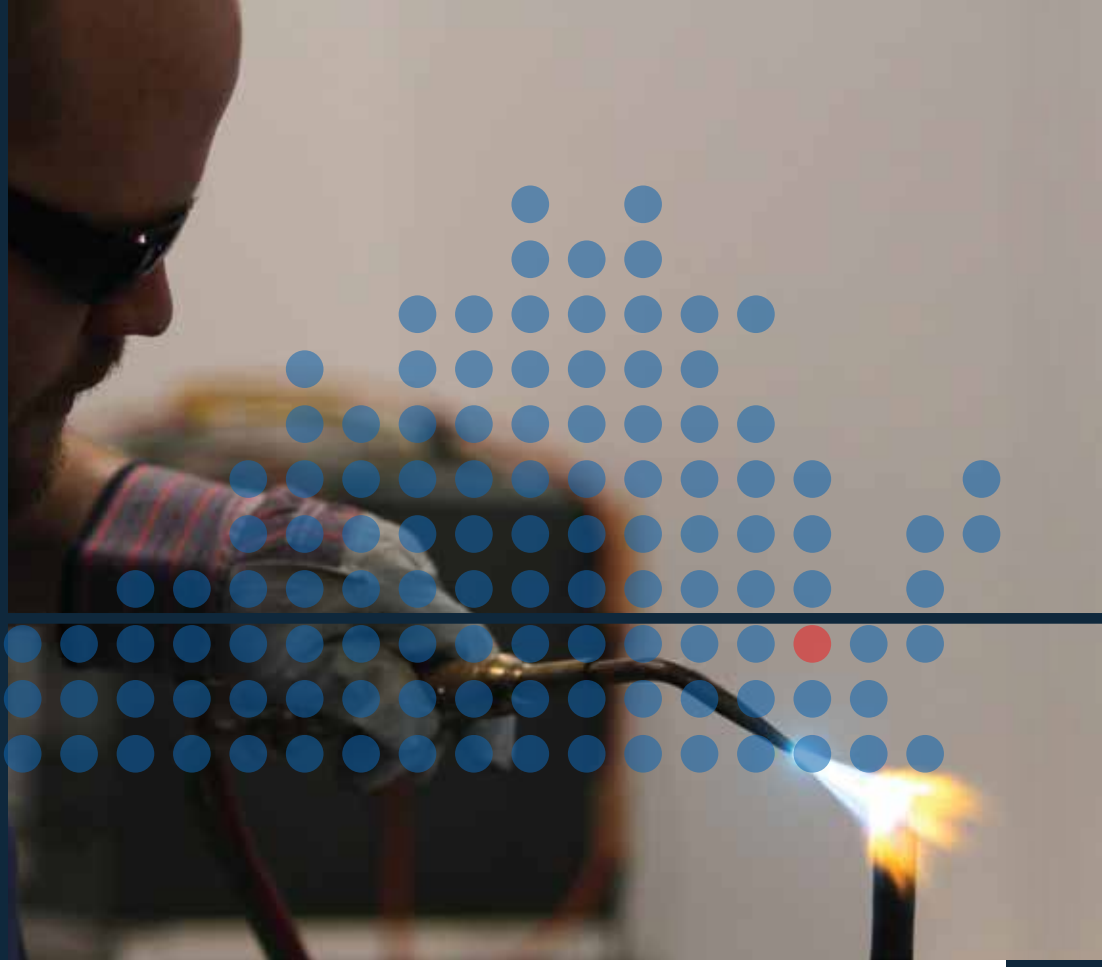
Stackable Credentials Examinations

We are an ESCO authorized proctor facility who offer portable and stackable credentials at all levels and stages of a technician career path in HVACR industry.

We are an NASTEC authorized proctor facility. NASTEC is a national certification program for technicians who service major home appliances. The NASTeC exams measure the knowledge, ability, and skills that technicians need daily to "do the job right."

- Refrigeration and Air Conditioning
- Cooking Equipment––
- Laundry and Dishwashing
- Universal Technician (All three specialties plus basic skills)

We proctor exams at Virginia Technical Academy. Exams consist of 2 hours for the Basic Skills Exam, and 1 additional hour for each specialty exam being taken.



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