

# HVAC/Plumbing

Because water and climate control systems are in every building



Learn and practice the fundamentals of fitting, assembling and preparing piping. Install residential/commercial heating, air conditioning, refrigeration and ventilation systems.



## Units of Study

- Blueprint Reading and Plumbing Drawings
- Drain Waste and Vent Systems
- Water Distribution Systems
- Fixtures, Valves and Faucets
- Water Heaters
- Boilers
- Radiant Heat and Baseboards
- Hydronic Installation and piping
- Carbon Pipe and Fittings
- Plastic Pipe and Fittings
- Copper Pipe and Fittings
- Gas Heat
- Copper and Plastic Piping Practices
- Soldering and Brazing
- Basic Electricity
- Fundamentals of Refrigeration
- Refrigeration Processes and Piping
- Ferrous Metal Piping Practices
- Fundamentals of Heating
- Forced-Air Gas Furnaces
- Electric Heat
- Air Distribution Systems
- Air Conditioning
- Heat Pumps

## Integrated Academics

- English
- Science

## Work-Based Learning

CTE programs bring students into the workplace for real life experiences. Businesses that supports our HVAC/ Plumbing program:

- Colonial Fire Protection Systems, Inc.
- Culligan Water Treatment
- ES Systems
- Hi-Qual Heating and Cooling
- Isaac Heating & Air
- John W. Danforth Co.
- MCC Applied Technology Center
- Red Rochester
- Start Rooter
- Wolf Mechanical

## Licensing / Industry- Based Certifications

- OSHA 10 Construction Industry
- EPA Refrigerant Handler Certification

## College Credits

MCC Dual Enrollment:

- HVA 101: Basic Refrigeration Theory
- HVA 103: Heating Systems & Troubleshooting
- HVA 105: Electrical Foundations & Troubleshooting

## Articulation Agreements

- Alfred State
- Monroe Community College
- University of Northwestern Ohio

## Career Outlook

All CTE programs correlate to many careers paths. Use the links below to explore more. One example:

Job Projections for HVAC Installers:  
15% projected growth in New York State jobs 2016-2026.

New York State salary range:  
\$38,120 entry level- \$68,790 experienced

Education Requirements: Career training is usually necessary by attending a technical school or learning on the job through an apprenticeship.

## Explore more:

<https://www.careerzone.ny.gov/>  
<https://www.onetonline.org/find/>



## Employability Profile

**Career Readiness**

Attendance \_\_\_\_\_

Punctuality \_\_\_\_\_

Appropriate Workplace appearance \_\_\_\_\_

Takes Initiative \_\_\_\_\_

High Quality of work \_\_\_\_\_

High Quality of work \_\_\_\_\_

Responsive to supervisor \_\_\_\_\_

Responsive to supervisor \_\_\_\_\_

Solves problems \_\_\_\_\_

Makes decisions \_\_\_\_\_

Cooperates with others \_\_\_\_\_

Resolves conflict \_\_\_\_\_

Observes critically \_\_\_\_\_

Takes responsibility for learning \_\_\_\_\_

Reads with understanding \_\_\_\_\_

Solves problems using math \_\_\_\_\_

Complies with health and safety rules \_\_\_\_\_

Uses technology appropriately \_\_\_\_\_

**Basic Safety**

Proper use and care of personal protective equipment(PPE) \_\_\_\_\_

Proper use of fire extinguishers to put out a fire \_\_\_\_\_

Read and interpret a MSDS sheet \_\_\_\_\_

**Plumbing Math**

Use common pipe-measuring techniques \_\_\_\_\_

Use fitting dimensions tables to determine fitting allowances and thread make-up \_\_\_\_\_

Calculate end-to-end measurements using fitting allowances and thread make-up \_\_\_\_\_

**Plumbing Tools**

Proper use of plumbing tools \_\_\_\_\_

Select the proper tools for the task \_\_\_\_\_

Proper maintenance for caring for hand and power tools \_\_\_\_\_

**Blueprints & Plumbing Drawings**

Use an architect's scale to draw lines to scale and to measure lines drawn to scale \_\_\_\_\_

Make isometric sketches from other drawings and \_\_\_\_\_

Prepare a material take-off for dwv, cold, and hot water piping from the sketches \_\_\_\_\_

**Drain Waste Vent**

Develop a material takeoff of DWV piping from a given set of plans \_\_\_\_\_

Installation of a DWV system using appropriate hangers and correct grade \_\_\_\_\_

Pressure test a DWV system \_\_\_\_\_

**Water distribution**

Develop a water supply piping material takeoff from a given set of plans \_\_\_\_\_

Install a water distribution system using appropriate hangers \_\_\_\_\_

Pressure test a water supply system \_\_\_\_\_

**Fixtures and Faucets**

Install bathtubs, shower stalls, valves, and faucets \_\_\_\_\_

Install lavatories, sinks, and pop-up drains \_\_\_\_\_

Install water closets and urinals \_\_\_\_\_

**Installing Water Heaters**

Install an electric water heater \_\_\_\_\_

Install a gas water heater \_\_\_\_\_

**Carbon, Plastic, Copper Pipe**

Select correct fitting for application \_\_\_\_\_

Hang and supporting steel pipe \_\_\_\_\_

Measure, cut, and join steel pipe \_\_\_\_\_

Follow proper joining procedures \_\_\_\_\_

**Copper and Plastic Piping Practices**

Measure the diameter of copper tubing \_\_\_\_\_

Cut and ream copper tubing using a tubing cutter \_\_\_\_\_

Bend copper tubing using bending tools \_\_\_\_\_

Make a swage joint in a section of copper tubing \_\_\_\_\_

Make and join flare connection \_\_\_\_\_

**Soldering and Brazing**

Solder tubing and fitting \_\_\_\_\_

Braze tubing and fitting \_\_\_\_\_

**Basic Electricity**

Use a multimeter to measure voltage \_\_\_\_\_

Use a multimeter to measure current \_\_\_\_\_

Use a multimeter to measure resistance \_\_\_\_\_

Use a multimeter to measure continuity \_\_\_\_\_

Assemble and test series and parallel circuits \_\_\_\_\_

**Mechanical Refrigeration**

Use cylinder colors to identify refrigerants \_\_\_\_\_

Locate compressors, condensers, evaporators, metering devices \_\_\_\_\_

Measure temperatures & pressures in an operating air conditioning system \_\_\_\_\_

Calculate superheat & subcooling \_\_\_\_\_

**Refrigerant Processes**

Pressure testing process \_\_\_\_\_

Leak checking with leak detectors \_\_\_\_\_

System evacuation \_\_\_\_\_

System charging \_\_\_\_\_

System recovery \_\_\_\_\_

**Refrigerant Accessories & Piping**

Use service valves to gain access to an air conditioning system \_\_\_\_\_

Locate accessories and piping within an air conditioning system \_\_\_\_\_

**Troubleshooting Cooling**

Develop a checklist for troubleshooting cooling systems \_\_\_\_\_

Isolate and correct malfunctions in a cooling system \_\_\_\_\_

**Ferrous Piping**

Cut, ream, thread, and assemble steel pipe \_\_\_\_\_

**Intro To Heating & Forced Air Gas Furnaces**

Install a gas furnace completely \_\_\_\_\_

Turn on and check a gas furnace \_\_\_\_\_

Adjust the manifold pressure \_\_\_\_\_

Perform preventative maintenance procedures on a gas furnace \_\_\_\_\_

**Air Distribution Systems**

Read and interpret equivalent length charts and required air volume/duct size charts \_\_\_\_\_

Measure static pressure in a duct system \_\_\_\_\_

Measure the velocity of airflow \_\_\_\_\_