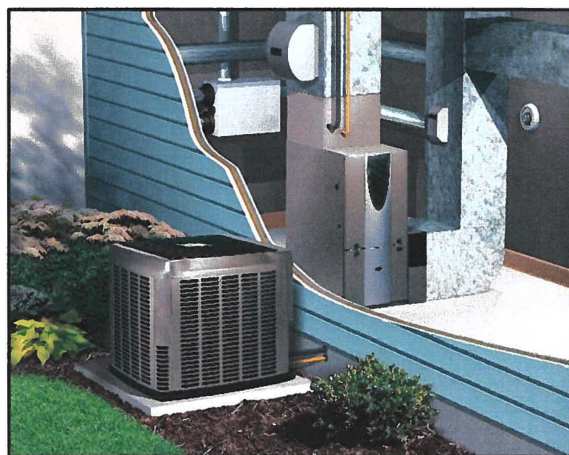


HEATING, VENTILATION & AIR CONDITIONING

Instructor	Robert Rossell
E-mail	rrossell@wactc.net
Phone	(724) 746-2890 Ext. 148
CIP Code	47.0201



COURSE OBJECTIVE

Students will obtain education and skills to work as installers, sheet metal fabricators and service technicians in the field of Heating, Ventilation and Air Conditioning.

COURSE DESCRIPTION

Heating, Ventilation and Air Conditioning is a 3-year program that prepares tenth, eleventh and twelfth grade students for employment to assist the mechanic in the servicing and installation of residential and commercial heating and cooling systems. Students are also prepared for the EPA certification exam for safe refrigerant handling.

COURSE TOPICS

Introduction to HVAC | Basic Safety | How to Handle Power & Hand Tools Properly
Blue Print Reading | Piping Practices | Basic Electricity | Introduction to Cooling | Introduction to Heating
Air Distribution Systems | Introduction to Hydronics | Leak Detection, Evacuation, Recovery & Charging
Trouble Shooting Heating | Trouble Shooting Cooling | Heat Pumps | Computer Fundamentals

REQUIRED SUPPLIES

Gloves (Leather, Not Synthetic) | Leather Work Boots (Steel-Toed Preferred) | Safety Glasses
Shop Shirt (Gray Pocket Tee) | Workwear Pants of Natural Material (100% Cotton, Gray) | Notebook Paper
(2) 8-Packs of Pencils | (2) 3-Ring Binders | (50) 8-1/2 x 11 Sheet Protectors | USB Drive, 8GB or Larger

TEXTBOOKS

Preparing for the Nate Exam-Core Essentials; Refrigeration Service Engineers Society; 2009
Preparing for the Nate Exam-Gas & Oil Heating; Refrigeration Service Engineers Society; 2010
Preparing for the Nate Exam-Air Conditioning & Heat Pumps; Refrigeration Service Engineers Society; 2009
NCCER-Core Curriculum; Pearson; 2015
NCCER-HVAC Level #1; HVAC Level #2; HVAC Level #3; Pearson; 2013
Environmentally Safe Refrigerant Service Tips & Techniques; Mainstream Engineering Corp.; 2011

COOPERATING COMPANIES

Associated Builders and Contractors, Inc. (ABC)
Louis T. Ursitz Heating & Air Conditioning-McDonald, PA
R. E. Michel Company, Inc.

Shearer Heating & Air Conditioning, Inc.
Sheet Metal Workers, Local Union 12
Steam Fitters UA Local #449

SPECIALIZED SHOP EQUIPMENT

Anemometer | Combustion Analyzers | Digital Manometer | Digital Micron Gauge | Digital Multi-Meter
Digital Scales | Digital Thermometers | Electronic Leak Detector | Refrigerant Recovery Machine
Sheet Metal Machines | Ultrasonic Electric Detector | Vacuum Pumps

CERTIFICATIONS

American Ladder Institute: Articulated Ladder; Mobile Ladder; Single & Extension Ladder; Step Ladder
CareerSafe OSHA – Construction
Mainstream Engineering: EPA 608; Green Energy Certification; Refrigerant #410-A Handling
National Center for Construction Education and Research (NCCER) Credentials
National Center for Construction Education and Research (NCCER) HVAC Levels 1, 2, 3 Curriculum
Credentials

ARTICULATION AGREEMENTS

Community College of Allegheny County
Penn Commercial, Inc.

Pittsburgh Technical College
Triangle Tech

POST-SECONDARY TRAINING OPTIONS

ABC (Associated Builders & Contractors, Inc.) Apprenticeship Opportunity
Community College of Allegheny County–Heating, Air Conditioning, Ventilation and Refrigeration
Maintenance Technology
Local #12 Apprenticeship Opportunity
Penn Commercial, Inc.–Heating, Ventilation, Air Conditioning & Refrigeration
Pennsylvania College of Technology–Heating, Air Conditioning and Refrigeration Technology
Triangle Tech, Inc.–Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology
UA Local #449 Apprenticeship Opportunity

POTENTIAL CAREERS

Building Maintenance Technician | Building Operations Controller | Consulting and Design Engineer
Domestic Refrigeration Technician | Electrician, Local #5 | HVAC Installation Mechanic
HVAC Technician | Inventory Control Technician | Job Estimator | Purchasing Agent | Self-Employment
Sheet Metal Worker, Local #12 | Steamfitter, Local #449

HEATING, VENTILATION AND AIR CONDITIONING SKILLS

Troubleshooting — Determining causes of operating errors and deciding what to do about it.

Repairing — Repairing machines or systems using the needed tools.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate and not interrupting at inappropriate times.

Equipment Maintenance — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Installation — Installing equipment, machines, wiring, or programs to meet specifications.

Social Perceptiveness — Being aware of others' reactions and understanding why they react as they do.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Coordination — Adjusting actions in relation to others' actions.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

WAGES AND EMPLOYMENT TRENDS FOR HVAC TECHNICIANS AND INSTALLERS

Pennsylvania Statistics:

Median Wages (2020)	\$25.24 Hourly, \$52,490 Annually
Number of Jobs (2018)	367,800 Employees Across the U.S.
Job Outlook (2018–2028)	9% Projected Growth in Pennsylvania
Employment Change (2018–2028)	1,880 Projected Job Openings

Source: *Onetonline.org*

WAGES AND EMPLOYMENT TRENDS FOR PLUMBERS, PIPE FITTERS AND STEAM FITTERS

Pennsylvania Statistics:

Median Wages (2019)	\$27.08 Hourly, \$56,330 Annually
Number of Jobs (2018)	490,200 Employees
Job Outlook (2018–2028)	10% Projected Growth in Pennsylvania
Employment Change (2018–2028)	49,800

Source: *Onetonline.org*

WAGES AND EMPLOYMENT TRENDS FOR SHEET METAL WORKERS

Pennsylvania Statistics:

Median Wages (2019)	\$24.70 Hourly, \$51,370 Annually
Number of Jobs (2018)	137,700 Employees
Job Outlook (2018–2028)	6% Projected Growth in Pennsylvania
Employment Change (2018–2028)	12,700

Source: *Onetonline.org*

WESTERN AREA CAREER & TECHNOLOGY CENTER
HEATING, VENTILATION & AIR CONDITIONING
2021-2022 Shop Requirements

Shop Uniform/Accessories

- Leather (Not Synthetic) Work Gloves (*Not* Mechanics Type)
- Hat with Shop Logo (Optional)
- Leather Work Boots (Preferably Steel-Toed)
- Safety Glasses (First Pair Provided by Western Area CTC)
- Tee Shirt, Gray (Use Enclosed Order Form)
- Workwear Pants, Gray (Natural Material, Preferably 100% Cotton. *No* Jeans.)
- (1) Ream College-Ruled Notebook Filler Paper
- (1) USB Drive, 8GB or Larger
- (2) 3-Ring Binders (1-inch, Black)
- (2) Packs #2 Pencils
- 25-ft. Tape Measure

APPROXIMATE COST: \$150

Cowboy boots are not permitted in the shop. Hats with the shop logo may be worn in the shop, but are not mandatory. No other hats are permitted. Order shop pocket tee shirts and hats by mailing the enclosed order form to TNT Manufacturing or by ordering online at companycasuals.com/WACTC. All uniform orders are delivered to Western Area and will be distributed to students after the start of the school year.

Uniform pants (preferably 100% cotton) may be purchased at any discount chain or department store. Workwear brands such as Dickies, Dockers and Carhartt are suggested. Lost or broken safety glasses may be replaced throughout the school year in the Main Office. Cost is approximately \$3.

Clinical activities/learning situations may require that any body piercings be removed and any tattoos covered.

Students may be required to wear professional clothing for vocational student organization conferences, competitions and meetings.

All criteria is subject to change.