Air Conditioning, Heating, and Refrigeration Technology
10-601-1 Associate Degree

Program Overview
The air conditioning and refrigeration industry is one of the fastest growing occupations. This program will prepare you to design, install, service, maintain, and operate HVAC/R systems in residential, public, and light commercial buildings. You will be trained to service systems in residential homes, hospitals, government buildings, schools, hotels and motels, apartment buildings, and office buildings.

Student Profile
As a student of this program, you should be able to:
- Learn mechanical principles and repair techniques
- Use good judgment
- Follow procedures carefully
- Handle and manipulate tools and equipment skillfully
- Assume responsibility for your work
- Adhere to required standards
- Adapt and handle a variety of duties and interruptions
- Work under pressure
- Move easily and lift 50 pounds
- Distinguish colors

Preparation for Admission
The following experiences will help you prepare for this program:
- General Math/Algebra
- Science
- Communications
- Health/Human Relations

Program Outcomes
Employers will expect you, as an Air Conditioning, Heating, and Refrigeration Technology graduate, to be able to:
- Practice safe techniques when servicing and testing HVAC/R systems.
- Troubleshoot HVAC/R systems.
- Use tools and equipment to service and/or test HVAC/R systems.
- Select equipment to install for an HVAC/R system.
- Estimate HVAC/R repair cost and order parts.
- Meet requirements for EPA Refrigeration Certificate.
- Interpret HVAC/R drawings.
- Estimate a heating and cooling load.
- Communicate HVAC/R service reports for customers.

Career Outlook
After graduating from the program, you will be ready to start your career as a(n):
- Residential HVAC/R Technician
- Commercial HVAC/R Technician
- Industrial HVAC/R Technician
- Mechanical Contractor HVAC/R Technician
- Facilities HVAC/R Technician
- Wholesale Service Representative

With additional education and/or work experience, graduates may find other opportunities for employment:
- Energy Management Technician
- Business Owner HVAC/R
- Practice Engineering of HVAC/R Systems

Curriculum

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1006181</td>
<td>Keyboarding</td>
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<tr>
<td>1060105</td>
<td>Sheet Metal Fabrication</td>
<td>2</td>
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<td>1060110</td>
<td>Air Conditioning Fundamentals</td>
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<tr>
<td>1060115</td>
<td>Basic Mechanical Fundamentals</td>
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<tr>
<td>10601121</td>
<td>Heating Systems</td>
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<tr>
<td>10601128</td>
<td>Electrical Controls and Systems</td>
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<tr>
<td>10601130</td>
<td>HVAC Print Reading</td>
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<tr>
<td>10601131</td>
<td>Heating System Applications</td>
<td>3</td>
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<td>10601133</td>
<td>Refrigeration Fundamentals</td>
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<tr>
<td>10601142</td>
<td>Hydronic Heating</td>
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<td>10601143</td>
<td>Refrigeration Applications</td>
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<td>10601145</td>
<td>Electronic Energy Management</td>
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<td>10601147</td>
<td>Control Circuit Applications</td>
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<tr>
<td>10601148</td>
<td>HVAC Electronic Troubleshooting and Repair (WBL)</td>
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<td>10601194</td>
<td>Heat Load Estimation</td>
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<td>10605112</td>
<td>Principles of AC/DC</td>
<td>3</td>
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<td>10890110</td>
<td>Information Resources</td>
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General Studies Courses

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<tr>
<td>10801095</td>
<td>Written Communication</td>
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<tr>
<td>10801197</td>
<td>Technical Reporting</td>
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</tr>
<tr>
<td>10801196</td>
<td>Oral/Interpersonal Communication</td>
<td>3</td>
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<td>10804113</td>
<td>College Technical Mathematics 1A</td>
<td>3</td>
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<tr>
<td>10809196</td>
<td>Introduction to Sociology</td>
<td>3</td>
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<td>10809199</td>
<td>Psychology of Human Relations</td>
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Program Requirements 67

- This course requires a prerequisite and/or corequisite, and must be completed with a grade of “C-” or better.
- Appropriate placement score or Introduction to College Writing course required.

Offered at:
Superior
Programs and Course Descriptions

Course Descriptions

10106181 Keyboarding - Credits: 1
This hands-on course emphasizes the introductory skills necessary in keyboarding using the touch system. You will master basic keyboard operation and develop keyboarding skills using the alpha, numeric, and symbol keys.

10601105 Sheet Metal Fabrication - Credits: 2
The layout and fabrication of a variety of sheet metal fittings.

10601110 Air Conditioning Fundamentals - Credits: 3
Topics covered include air conditioning principles and terms, physical principles of air movement and humidity, methods of conditioning air for comfort and health, the proper use of psychrometers, dry bulb thermometers, hygrometers, pitot tubes, recorders, manometers, and barometers, and the reading and interpretation of psychrometric charts and scales.

10601115 Basic Mechanical Fundamentals - Credits: 3
This course is designed to introduce the learner to the basic fundamental skills necessary to work in the HVAC/R Industry. Instruction will be given in learning the various types of piping and tubing used in air conditioning, heating, and refrigeration; types of fittings, bending, brazing, soft soldering tubing, black iron pipe work, using hand tools, and the recognition and practice of safety procedures while working on heating, air conditioning, and refrigeration systems.

10601121 Heating Systems - Credits: 3
Topics include introduction to heat principles, temperature measurement, fuels and other sources of heat, combustion, basic heating systems, basic furnace design, gas furnace design and operation, venting of furnaces, chimney or exhaust gases, and system controls.

10601128 Electrical Controls & Systems - Credits: 3
Topics in this course include basic electricity review, control circuits, symbols, diagrams, protection devices, transformers, relays, thermostats, single-phase motors, capacitors, control components, and troubleshooting AC system wiring diagrams. Electrical experience equivalent to 10605112 Principles of AC/DC is recommended.

10601130 HVAC Print Reading - Credits: 2
Topics include print reading; understanding, interpreting, and utilizing architectural working drawings; safety procedures, drafting techniques, and lettering.

10601131 Heating System Applications - Credits: 3
Topics include installation, start-up, and service of gas- and oil-fired heating equipment; air conditioning and air-to-air heat pump systems; and electrical and mechanical testing/analyzing of system components.

10601133 Refrigeration Fundamentals - Credits: 3
Topics include refrigeration principles and terms, thermodynamic processes, refrigerants, vapor compression cycles, mechanical refrigeration system components, use of electrical controls, refrigeration applications, and refrigeration tools and materials.

10601142 Hydronic Heating - Credits: 3
Topics include heating ignition systems, oil boiler installation and start-up, venting of gas-fired boilers, heating with hot water, multiple boiler systems basics, and zoning hydronic heating systems.

10601143 Refrigeration Applications - Credits: 3
Topics include domestic and commercial refrigeration systems, applications, installation, servicing, troubleshooting, heat loads and piping, controls, and special refrigeration components.

10601145 Electronic Energy Management - Credits: 3
This course serves as an introduction to how a heating, ventilating, and air conditioning control system is used to operate a building’s mechanical equipment so as to maintain the desired environmental conditions.

10601147 Control Circuit Applications - Credits: 3
Topics include control circuit terminology, measuring devices, and control systems. The principles of self-contained, electromechanical, and electronic-electric controls are examined and applied to control systems operation and design.

10601148 HVAC Electronic Troubleshooting and Repair (WBL) - Credits: 3
This course is designed for the advanced student who has already completed the theoretical and basic hands-on classes. In this class the student will be responsible for troubleshooting and repairing a variety of HVAC/R equipment. The student will be required to diagnose the faulty equipment, select the proper replacement parts, return the equipment to a working condition, and prepare a detailed work order listing all work performed.

10605112 Principles of AC/DC - Credits: 3
This course provides an introduction to DC and AC electricity. The students will be able to perform basic resistance, current, voltage, and power calculations and measurements in both DC and AC circuits. Knowledge and use of test equipment will focus on multimeters and oscilloscopes. Critical thinking skills are emphasized to develop competencies in problem solving and troubleshooting. This is a lab- and lecture-based course that provides hands-on and theoretical learning.

10804113 College Technical Mathematics 1A.

Graduate Employment Information
(WITC Graduate Survey Responses 2005-2006)

<table>
<thead>
<tr>
<th>Number of graduates</th>
<th>Number employed</th>
<th>% employed in WITC district</th>
<th>Range of yearly salary</th>
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<tbody>
<tr>
<td>10</td>
<td>7</td>
<td>20%</td>
<td>$20,798-$29,898</td>
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<tr>
<td>Number of responses</td>
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<tr>
<td>Number available for employment</td>
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<td>Employed in related field</td>
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WITC Graduate Survey Responses 2005-2006

800.243.9482      witc.edu