WHY REDSTONE? Since 1965, more than 10,000 Redstone College students have become skilled, in-demand graduates, thanks to an education formula designed for success:

• faculty with industry experience
• hands-on training
• career-focused education
• industry relationships
• career assistance
• tuition-free alumni retraining (books, tools, lab fees may apply)

HVAC PROGRAM
HEAT UP YOUR CAREER

Real-Job Training. Real-Job Rewards.

Redstone uses Snap-on tools. Specific Snap-on tools vary depending on program requirements.

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If you’re a high school student, please call 888-748-0010 or visit us online at redstone.edu/highschool.

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R1168-05/15
HVAC: ALWAYS IN DEMAND

Environmental concerns and the drive to reduce energy consumption has prompted the development of new energy-saving heating and air-conditioning systems, leading to the installation of newer, more efficient systems in existing homes and buildings.

Career Profile

HVAC (heating/ventilation/air conditioning) is an in-demand, hands-on career path. HVAC mechanics and installers are needed wherever climate-control equipment is installed, repaired, or maintained.

HVAC expertise is in demand in three distinct sectors: residential, commercial and industrial. That’s why your Redstone education covers them all.

And because HVAC systems are increasingly sophisticated, graduates of technical schools are generally preferred job candidates, thanks to hands-on training and their across-the-board knowledge of HVAC systems.

Typical Entry-Level Positions for Graduates

HVAC Service Technician
HVAC Installer
Refrigeration Mechanic

For more information about our graduation rates, the median debt of students who completed the program, and other important information, please visit our website at http://www.redstone.edu/disclosures

Career Outlook

Employment for HVAC mechanics and installers is projected to increase 21 percent by 2022, faster than the average for all occupations. Four factors are fueling the demand:

1. Thousands of building-boom homes are reaching an age where HVAC systems will need to be replaced.
2. More technically sophisticated HVAC systems is likely means more equipment maintenance, resulting in more service calls and repairs.
3. A steady increase in HVAC technician retirements will create a demand for replacement workers.
4. Many contractors are already reporting challenges finding enough HVAC professionals to meet service demands.

It all adds up to an excellent job outlook for HVAC professionals.


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A College Degree Pays Off*

<table>
<thead>
<tr>
<th>EDUCATION ACHIEVED</th>
<th>MEDIAN ANNUAL INCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than a high school diploma</td>
<td>$25,376</td>
</tr>
<tr>
<td>High school graduate, no college</td>
<td>$35,776</td>
</tr>
<tr>
<td>Associate degree</td>
<td>$41,184</td>
</tr>
</tbody>
</table>


Diploma in 10 months - residential and light commercial training

- You will be trained on residential and light commercial HVAC/R systems.
- Students will learn air conditioning for small and medium types, as well as refrigeration systems.

Associate of Occupational Studies degree in 17 months - additional industrial training

- You will receive additional training on industrial HVAC/R systems, as well as residential and commercial HVAC systems.
- Students will also learn about supermarket refrigeration and ice machines, building automation systems, hot water and solar heat systems, and chilled water systems.
- This degree will provide you with business and communication skills.

With hands-on training under the skilled guidance of experienced professionals, Redstone’s HVAC program prepares graduates for entry-level HVAC positions. You’ll learn the HVAC trade in simulated work environments in our industry-relevant lab with features such as:

1. Thousands of building boom homes are reaching an age where HVAC systems will need to be replaced.
2. More technically sophisticated HVAC systems likely mean more equipment maintenance resulting in more service calls and labor.
3. Already greater service demands and demands for replacement workers.
4. Technicians are already reporting challenges finding enough HVAC professionals to meet the demand.

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With more than 20 residential furnaces and AC units, students will also learn air conditioning for small and medium types, as well as refrigeration systems.

You’ll graduate qualified to perform HVAC maintenance wherever the need exists, such as residences, commercial buildings, or assembly line plants.

Generally speaking, certification increases advancement opportunities. Redstone prepares you for important certification exams:

- HVAC entry-level certification tests
- Competency exams offered by the Air Conditioning and Refrigeration Institute

The Department of Labor lists the following as potential careers for program graduates.†

Standard Occupation Code (SOC)

49-9021 Heating, air conditioning, and refrigeration mechanics and installers

To see descriptions of these occupations, go to www.onetonline.org and enter the six-digit Standard Occupation Code (SOC) in the occupational search area.

*Graduates wishing to attain certification must take and pass any applicable tests/exams.
†This list is based on Department of Education standards. Actual entry-level job responsibilities may vary by state. This list is not intended to describe or limit the job duties a Redstone College graduate may perform. This list is not intended to be all-inclusive.

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- night classes accommodate students’ day jobs
- preparation for Environmental Protection Agency (EPA) Certification*
- financial assistance†
- no-cost tutoring
- Snap-on® tool kit

*Graduates wishing to attain certification must take and pass any applicable exams.
†Available to those who qualify

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if you’re a high school student, please call 888-748-0010 or visit us online at redstone.edu/highschool.

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R-1068-07/16
HVAC COURSES
Diploma in 10 months
Associate of Occupational Studies in 17 Months

The Redstone College HVAC Associate of Occupational Studies program consists of the following courses:

(*) Indicates diploma courses

Listed below is the course curriculum:

APM120 – Introduction to Business
3.0 Credit Hours
This course is designed to be an introduction into the operation of an HVAC business. Topics covered include an overview of various types of traditional businesses and e-business models, building a business, business law and government regulations. Special emphasis is placed on HVAC businesses in the “new economy”. Upon completion of this course, students should be able to describe the basic concepts to starting and operating an HVAC business.

CA110 - Computer Applications
3.0 Credit Hours
This course is designed to increase proficiency in the use of common word processing, spreadsheet and presentation application software. Topics include the production of business documents and reports. Upon successful completion of this course, students will be able to prepare documents using word processing, spreadsheet, and presentation software.

ENG110 - Business Writing
3.0 Credit Hours
The emphasis of this course is to prepare students to apply the writing process to the documents and situations they will encounter in the workplace. Upon completion of this course, students should be able to prepare well-constructed correspondence, reports, proposals, instructions, presentations, and elements of research, email, and use of technology for visual presentations.

HV120 - Refrigeration and Air Conditioning Fundamentals (*)
6.0 Credit Hours
This course introduces the fundamentals of refrigeration and air conditioning as they apply to the HVAC industry. Topics include safety, refrigeration theory, installation and service of refrigeration and air conditioning units, thermodynamics, refrigeration cycle, troubleshooting techniques, recovery, recycling and reclamation of refrigerant and brazing and pipe fabrication fundamentals. Upon successful completion of the course, students will be able to describe the laws of thermodynamics as applied to refrigeration, and be able to apply these concepts to the operation of the refrigeration cycle.

HV123 Air Duct Calculation and Fabrication (*)
4.0 Credit Hours
This course will provide students with the theory and application of sheet metal fabrication for use in residential and light commercial HVAC systems installation. Topics include skills, equipment and procedures involved with metal cutting, bending, forming, joining air duct systems, air duct sizing, calculating air flow, friction and static pressure. Upon successful completion of this course, students should be able to design and air duct system, calculate the airflow (CFM), lay out and fabricate an HVAC supply and return plenum, transitions, squares, radius elbows, and install a complete air duct system for a residential and light commercial HVAC system.
HV125 – Building Mechanical Codes (*)
4.0 Credit Hours
This course will provide students with a working knowledge of mechanical, fuel, gas, plumbing and electrical codes. Topics include code requirements for combustion air systems, venting systems, fuel piping systems, electrical wiring and plumbing for residential and commercial HVAC applications. Upon completion of this course, students should be able to understand building codes and their application to HVAC systems.

HV130 – Electricity and HVAC Control Systems (*)
12.0 Credit Hours
This course introduces the fundamentals of electricity as they apply to the HVAC industry. Topics include electrical theory, reading wiring schematics, electrical installation, service and troubleshooting of air conditioning and gas heating units, electrical heat, electron theory of electricity, Ohms Law, Watts Law, electrical components, wiring circuitry and electrical safety. The course also includes the study of modern HVAC control systems and their application. Upon successful completion of the course, students should be able to describe the electron theory of electricity, along with Ohms Law, Watts Law, and describe how wiring circuitry is used in the HVAC industry.

HV140 – Forced Air Gas Heating and Air Conditioning Systems (*)
7.5 Credit Hours
This course introduces students to the fundamentals of residential and light commercial heating and cooling. Topics include installation/service of residential and light commercial forced air furnaces, heat pumps, split AC systems, package roof top units, heating and cooling controls and circuitry and troubleshooting electrical and mechanical components of heating and cooling equipment. Upon successful completion of the course, students should be able to explain the sequence of operation and troubleshoot residential and light commercial heating and cooling equipment.

HV150 – Advanced Refrigeration (*)
6.0 Credit Hours
This course introduces students to an overview of commercial refrigeration. Topics include installation/service of walk-in coolers and freezers, reach-in coolers and freezers, EPA guidelines for the proper use of refrigerant, troubleshooting techniques of mechanical and electrical systems, airflow measurements, diagnostic principles and refrigeration circuits and controls. Students may test for their CFC Certification. Upon successful completion of this course, students should be able to recall the EPA guidelines for the proper handling of refrigerant and know the concepts for troubleshooting and repair of the electrical and mechanical systems of commercial refrigeration units.

HV220 – System Design and Heat Load Calculation (*)
4.5 Credit Hours
This course provides training in the reading of HVAC construction prints as they apply to existing and new construction, and the application of HVAC system design principles. Topics include how to read HVAC construction prints, ductwork design, heat load calculations, equipment sizing, HVAC system analysis, system setup, inspection and repair of HVAC system installations, design considerations, indoor air quality and comfort and psychrometrics. Upon completion of this course, students should be able to demonstrate the ability to accurately read HVAC construction prints, understand system design principles, and understand how to determine indoor air quality.*

HV230 – HVAC Pneumatic Controls (*)
6.0 Credit Hours
This course provides a detailed study of electrical, electromechanical and pneumatic control systems in commercial and industrial buildings. Topics include HVAC fundamentals, commercial HVAC systems, HVAC system energy sources, control principles, control systems, air compressor stations, pneumatic actuators, dampers, valves, thermostats, humidistats, pressure switches, transmitters, receiver controllers, auxiliary devices and pneumatic control system applications. Upon completion of this course students should be able to apply system and equipment standards to the installation and repair of HVAC pneumatic control systems.

HV235 – Supermarket Refrigeration and Ice Machines
6.0 Credit Hours
This course will include the fundamentals of industrial machines, supermarket refrigeration, controls and circuitry, troubleshooting and repair of commercial equipment, startup procedures, retrofitting of new systems, multi-capacity systems, equipment and refrigerant pipe sizing and estimating installation and construction of a walk-in cooler and freezer. Upon successful completion of this course, students should be able to describe the fundamental principles of ice machines, supermarket refrigeration, and be able to troubleshoot electrical and mechanical components within a refrigeration system.

HV236 - Advanced Building Automation Systems
6.0 Credit Hours
This course builds on the concepts that are introduced in the HV230 HVAC Pneumatic Controls course. Topics include electrical and electronic control systems, building automation systems and controllers, operator interfaces, building automation system inputs and outputs, installation, wiring, testing, networking and web-based control, direct digital control strategies, supervisory control strategies, building automation system retrofit, building system management, utilities and surveys, building automation troubleshooting and advanced control technologies. Upon completion of this course, students should be able to analyze, diagnose, and repair direct digital controls as well as how to interface with building automation systems.”
HV240 - Hot Water and Solar Heat Systems
9.0 Credit Hours
This course provides training in the service and troubleshooting of hot water and oil heat systems, flame safeguard technology, geothermal heat pumps and solar heat. Topics include heat load estimates, pipe sizing, fittings and valves, hydronic heat sources, fluid flow in piping, properties of water, circulating pumps, heat emitters, control strategies, heat exchangers, hydronic radiant panel heating, hot water distribution systems, expansion tanks, air removal, filling and purging, auxiliary loads and specialized applications. Upon completion of this course, students should be able to apply troubleshooting techniques in the service of hot water and oil heating systems, geothermal heat pumps, and solar heat, as well as demonstrate service procedure and installation techniques.

HV250 - Chilled Water Systems
6.0 Credit Hours
This course provides students with a working knowledge of the fundamentals of chilled water systems including cooling towers and the types of controls and circuitry used. Topics include high / low pressure and absorption chiller operation, subcooling, superheat, metering devices, cooling towers, system and circulation pumps, operation maintenance and troubleshooting, water flow calculation, chilled water system pipe sizing, properties of heat transfer fluids, start-up procedures for a chilled water air conditioning system, autopsy of a compressor used in chilled water systems and standard safety procedures. Upon completion of this course, students should be able to properly size and install chilled water piping systems, and be able to apply the proper start-up and preventative maintenance procedures for chilled water systems.

MTH115 – Basic Mathematics
3.0 Credit Hours
This course covers basic mathematics as related to the HVAC field. Topics include the four operations on whole numbers, fractions, decimals, and real numbers, using percents, and applying basic formulas such as area, perimeter and volume. Upon completion of this course, students should be able to solve problems using basic mathematical operations.

SOC110 – Customer Relations
3.0 Credit Hours
This class focuses on customer relations concepts and their impact on the HVAC industry. Topics include basic customer relations concepts, problem solving and handling of difficult customers, telephone and internet techniques, communication do's and don'ts and ideas and techniques. Upon completion of this course, students should be able to demonstrate proper customer relations concepts and be able to solve various customer related problems.

Please see current academic catalog for course prerequisite information

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R-1093-07/16