

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Diploma Program

36 weeks – 720 hours, 55 credit units

The Heating, Ventilation and Air Conditioning (HVAC) program provides students the skills required to specialize in the field of residential heating and air conditioning service and repair. Most areas of the world require some residential climate control, therefore basic construction, basic electricity, air conditioning, fuel-heating systems, heat pumps, air distribution, system application and design, system controls, and HVAC diagnostics are taught in the program.

The HVAC program consists of nine modules. Upon successful completion of all modules of the program, students will be awarded a diploma.

Graduates of the program can seek employment as entry-level technicians in the residential heating, ventilation and air conditioning field, including Sheet Metal Fabrication Apprentice, Furnace Install and Repair Apprentice, Furnace Cleaner, A/C Mechanic Apprentice, and A/C Install/Service Apprentice. Intermediate and advanced positions include Electrical Heat Assembler, Heating & Air Conditioning Installation/Service, Gas Furnace Installation and Repair, Sheet Metal Mechanic, Sheet Metal Lay-Out, Sheet Metal Machine Operator, Sheet Metal Fabricator, Sheet Metal Installer, A/C Unit Tester, A/C Technician, and A/C Mechanic.

Course Code Course Title

CON 1010 Basic Construction 80 hours 7 credits

ACR 1010 Basic Electricity 80 hours 6 credits

ACR 1060 Air Conditioning 80 hours 6 credits

ACR 1110 Fuel Heating Systems 80 hours 6 credits

ACR 1160 Air Distribution 80 hours 6 credits

ACR 2010 Systems Controls 80 hours 6 credits

ACR 2060 Heat Pumps 80 hours 6 credits

ACR 2110 System Application and Design 80 hours 6 credits

ACR 2160 HVAC Diagnostics 80 hours 6 credits

Total 720 Hours 55 Credits

CON 1010 – Basic Construction 7 Quarter Credits

This course introduces students to the construction field. The course of instruction will cover basic job safety concepts and regulatory requirements; basic math used in the construction trades; the use of common hand and power tools; an introduction to blueprint reading; basic rigging; communication and employability skills. Students will also learn techniques for studying and test-taking. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: None.* Lecture Hours: 60 Lab Hours: 20

ACR 1010 – Basic Electricity 6 Quarter Credits

This course of instruction will cover basic job safety concepts, history of electricity, electrical theory, electrical power, electrical measuring, applications and electrical components. Power sources, component operation and circuit diagrams are studied. Students use this theory, integrated with objective specific hands-on lab exercises to practice typical equipment manufacturer's diagnostic techniques. Testing instruments and wiring diagrams are used for systems problem-solving projects. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: None.* Lecture Hours: 40 Lab Hours: 40

ACR 1060 – Air Conditioning 6 Quarter Credits

This course of instruction will cover basic laws of physics and cooling theory, terms, definitions, air conditioning cycles, component operations, mechanical and electrical diagrams, standard and high efficiency air conditioning systems. Pressure/temperature charts, refrigerant piping specifications and installation will also be covered. Usages of various tools are covered. Structured lab projects allow students to learn industry-approved diagnostics, service and repair procedures. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: None.* Lecture Hours: 40 Lab Hours: 40

ACR 1110 – Fuel Heating System 6 Quarter Credits

This course of instruction will cover combustion and various hydrocarbon fuels. Appliance heaters and warm air furnaces will be covered. Operation of controls, testing and servicing equipment, installation, and operation are also covered. Fuel heating system diagnosis and wiring diagrams are explored. Structured lab projects allow students to learn industry-approved diagnostics, service and repair procedures. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: None.* Lecture Hours: 40 Lab Hours: 40

ACR 1160 – Air Distribution 6 Quarter Credits

Students in this course of study will learn to read blue prints, use shop math, perform load calculations, indoor air quality, and system air balancing and apply the fundamentals of air distribution to system design. In structured lab projects, students will use the tools and equipment necessary to service and repair HVAC air distribution systems. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: None.* Lecture Hours: 40 Lab Hours: 40

ACR 2010 – Systems Controls 6 Quarter Credits

This course presents electrical and electronics theory, terms, definitions, symbols, circuits, laws and formulas. Power sources, component operation and circuit diagrams are studied. Students use this theory, integrated with objective specific hands-on lab exercises to practice typical equipment manufacturer's diagnostic techniques. Testing instruments and wiring diagrams are used for systems problem-solving projects. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: ACR 1010.* Lecture Hours: 40 Lab Hours: 40

ACR 2060 – Heat Pumps 6 Quarter Credits

Air properties related to HVAC and heat pump systems design are studied in this course. Component operation, systems diagrams and industry approved troubleshooting are discussed and reinforced with structured lab exercises. Out-of-class activities will be assigned and assessed as part of this module. *Prerequisites: ACR 1010 and ACR 1060.* Lecture Hours: 40 Lab Hours: 40

ACR 2110 – System Application and Design 6 Quarter Credits

This course introduces students to various HVAC system applications. Various HVAC designs, joining and sizing of various types of piping and tubing, system charging, load calculations, wiring, safety and proper diagnostics procedures, EPA Section 608, refrigerant handling and containment (recovery, recycling and reclaiming) and certification requirements are discussed in this course. Students will participate in structured lab exercises including inspection, diagnostics, service, troubleshooting and repair of residential gas heating systems. *Prerequisites: ACR 1160, ACR 2010, ACR 1010 and ACR 1060.* Lecture Hours: 40 Lab Hours: 40

ACR 2160 – HVAC Diagnostics 6 Quarter Credits

This course introduces students to HVAC diagnostic fundamentals. Emphasis is placed on testing equipment, gas identifiers, wiring diagrams, refrigerant schematics, systems testing, load distribution and controls operation. Mechanical components, gas pipe sizing, wiring, safety and proper diagnostic procedures are taught. Students will participate in structured lab exercises including inspection, diagnostics, service, troubleshooting and repair of HVAC systems. *Prerequisites: ACR 1010, ACR 1060, ACR 2010 and ACR 1160.* Lecture Hours: 40 Lab Hours: 40