

# HEATING, VENTING, AIR CONDITIONING, REFRIGERATION (HVACR)

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## **courses**

### **HVACR-115 BASIC ELECTRICITY 5 Credits**

The student will learn basic electricity principles including how to measure voltage, current, resistance, and wattage. Troubleshooting various types of motors (single-phase and three phase) along with capacitance and inductance measures will be taught. Further, the course will explain how various controls are used in HVAC-R and other maintenance fields as well as their applications. Shaft alignment and various motor mounting is taught. Cross-listed with IMMTI-115.

### **HVACR-120 HVAC PRINCIPLES 5 Credits**

Teaches the proper handling procedures of refrigerants, brazing techniques, the evacuation and charging processes, the proper usage of tools specific to this trade, installation requirements, heat transfer, and familiarizes the student with a typical refrigeration cycle. Plastic, copper, and steel tubing as well as piping usage are taught. Students learn how to work with others on team building exercises.

### **HVACR-130 TRADE SKILLS 5 Credits**

Introduces skills needed in construction/manufacturing/industrial trades. Subjects include blueprint reading, construction documents, hand tools, fasteners/anchors, construction equipment, safety, resume building, teamwork, leadership, and trade accounting. Cross-listed with IMMTI-130.

### **HVACR-140 MECHANICAL SYSTEMS MAINTENANCE 5 Credits**

Emphasis on skills needed for millwrights and maintenance personal including proper bearing installation, lubrication methods, alignment of motor and other equipment installation needs, pneumatic and hydraulic systems, and seal installation will be included. Pumps and compressor maintenance and control devices are taught. Proper rigging procedures for lifting heavy and awkward equipment will be emphasized. Cross-listed with IMMTI-140.

### **HVACR-225 REFRIGERATION THEORY 5 Credits**

Study of the operation and service of commercial refrigeration systems to include evaporators, condensers, compressors, and metering devices. Defrost systems and commercial ice making are also covered. Electrical control systems, pressure control systems, and other devices specific to refrigeration systems will be taught. The course will also prepare students to take the ESCO Refrigerant Certification for handling all refrigerants as required by the EPA.

### **HVACR-230 ADVANCED HVACR CONTROLS 5 Credits**

Understanding a sequence of operations and enhancing skills to troubleshoot electrical circuits. Introduction to programmable logic controllers (PLC's) and building automation systems as used in the HVACR industry, along with pneumatic system and integration strategies.

### **HVACR-235 A/C SYSTEM DESIGN AND INSTALLATION 6 Credits**

Service and operation of air conditioning systems to include evaporators, condensers, compressors, and metering devices. Air distribution and comfort/psychometrics will be taught. All-weather systems will be worked on including heat pumps. Defrost systems will also be taught. Requirements to prepare students for the low voltage certification as required by Washington State will also be covered.

### **HVACR-240 DUCT FABRICATION 2 Credits**

Duct design, selection and fabrication of materials to create duct systems for proper air delivery. Students will learn to size systems for various installation needs.

### **HVACR-250 GAS CODE REVIEW 2 Credits**

The study and understanding of properly installing and sizing venting systems as well as pipe sizing for correct combustion for gas heating appliances. This 60-hour course uses the International Fuel Gas Code to prepare students for the Idaho HVAC Journeyman License. This course relates subject matter taught in HVACR-255 Heating Systems.

### **HVACR-255 HEATING SYSTEMS 6 Credits**

Learn basic operation and service of heating systems to include electric, gas, oil, hydronic, solar, and heat pump systems. Study of the controls used in these systems and troubleshooting techniques will be taught as well as venting and piping requirements as used on these products.

### **HVACR-260 MECHANICAL AND ELECTRICAL CODE REVIEW 2 Credits**

Capstone course preparing students for the Idaho HVAC Journeyman License. The study of the International Mechanical Code to familiarize the student with subject matter taught in HVACR-120 HVACR Principles. In addition, the National Electrical Code (NEC) along with revisiting HVACR-115 Basic Electricity, will be used to prepare students for the Washington 06a Low-Voltage certification.

### **HVACR-265 HYDRONIC SYSTEMS 2 Credits**

Provides basic knowledge of water heating systems to include gas, and electric hot water heaters as well as gas and oil hydronic heating systems. The student will learn basic operation and service of water heating systems, study controls used in these systems, trouble-shooting techniques, and determine venting/piping requirements as used on these products. Chillers are also discussed as well as the pumps used for circulation.

### **HVACR-290 DS:HEAT/VENT/AC/REF TECH 1-8 Credits**

Directed Study in Heating, Venting, Air Conditioning and Refrigeration.

**HVACR-294 INTERNSHIP 2-8 Credits**

This is a capstone course. The student will relate on the job experience to the material covered in Trade Skills. This will include communication skills, research skills, critical thinking, team building, and leadership. This will be a blended course in which the student will need to access, participate and complete tasks through an online forum. Cross-listed with IMMTI-294.

**HVACR-390 DS:HEAT/VENT/AC/REF TECH 12 Credits**

Directed Study in Heating, Venting, Air Conditioning and Refrigeration.

**HVACR-394 IN:HEAT/VENT/AC/REF TECH 1-12 Credits**

This is a capstone course. The student will relate on the job experience to the material covered in HVACR-130: Trade Skills. This will include communication skills, research skills, critical thinking, team building, and leadership. This will be a blended course in which the student will need to access, participate and complete tasks through an online forum. Cross-listed with IMMTI-294.