Heating, Ventilation, Air Conditioning, & Refrigeration

Refrigeration Principles

HVACR 1100 - 3 Credits

Basic laws of matter, fluids, gases, compression systems, refrigeration controls, refrigerants and components. Included are Pressure Enthalpy (PH) charts, evaporators, condensers, metering devices, compressors and an introduction to service refrigeration systems. (2 lecture hours, 2 lab hours)

Intro to Safety, Materials & Equipment

HVACR 1105 - 3 Credits

The use and care of hand tools, special tools used in air conditioning, pipe fitting, copper tubing, brass fitting, flaring, soldering and safety. Orientation to job entry specification and occupational opportunities. (2 lecture hours, 2 lab hours)

Refrigerant Certification

HVACR 1108 - 1 Credits

Environmental handling, refrigerant equipment and certification types are covered. Federal Government requires all individuals who open a system or container holding refrigerant to be certified. EPA refrigerant certification test given. (1 lecture hour)

Introduction to Controls

HVACR 1110 - 3 Credits

Practical study of electricity, electrical hardware, and electrical test instruments that are used in the heating, air conditioning and refrigeration industry. Basic electricity, circuits, schematics, power distribution, electrical components and motors. (2 lecture hours, 2 lab hours)

Residential Refrigeration

HVACR 1112 - 3 Credits

Analysis of the operation of refrigeration systems, leak detection, leak repair, charging, component, replacements, schematic reading and troubleshooting domestic refrigerator and window air conditioning units. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105, and 1110 or consent of instructor (2 lecture hours, 2 lab hours)

Introduction to Sheet Metal

HVACR 1161 - 2 Credits

Basic fitting layouts. Various types of seams, elbows and triangulation used in constructing various square and round fittings. Drawing and fabrication of the fittings are required. (4 lab hours)

Introduction to Heating

HVACR 1180 - 5 Credits

Gas combustion, venting, operation of a heating unit, electrical circuitry, zoning and accessories. Servicing, troubleshooting and repairing mechanical and electrical components, and proper installation of heating units. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1110 or consent of instructor (4 lecture hours, 2 lab hours)

Introduction to Hydronics

HVACR 1186 - 2 Credits

Principles of steam, water, piping and their components are covered with respect to boilers, water treatment and electrical circuitry. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1180 or consent of instructor (1 lecture hour, 2 lab hours)

Central Heating Plants

HVACR 1187 - 3 Credits

Theory of large boiler systems operation. Low and high pressure boilers, air handling equipment, heat exchangers, pumps, controls, water treatment, accessories, service and preventive maintenance are covered. Field trips to central heating plants are included. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1180 or consent of instructor (2 lecture hours, 2 lab hours)

Selected Topics

HVACR 1827 - 1 Credits

Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college Class Schedule. This course may be taken four times for credit as long as different topics are selected. (1 lecture hour)

Heating, Ventilation, Air Conditioning, & Refrigeration

Independent Study

HVACR 1840 - 1-4 Credits

Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. Prerequisite: Consent of instructor is required (2 to 8 lab hours)

Residential Air Conditioning

HVACR 2201 - 3 Credits

Split and package air-conditioning systems, proper installation, operation, servicing, repair of mechanical and electrical components, and air treatment. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110 or equivalent, or consent of instructor (2 lecture hours, 2 lab hours)

Commercial Air Conditioning

HVACR 2202 - 3 Credits

Commercial air-conditioning equipment, mechanical and electrical components, service repair, operation, capacity control, proper installation, zone control, and psychometrics. Includes mechanical components of rooftop heating systems and start-up procedures. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1180 and 2201 or consent of instructor (2 lecture hours, 2 lab hours)

Heat Pumps

HVACR 2205 - 2 Credits

Theory of the refrigeration cycle with respect to heat pumps and electrical heat. Includes mechanical and electrical operation, service, repair and proper installation. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110 or consent of instructor (1 lecture hour, 2 lab hours)

Commercial Refrigeration

HVACR 2210 - 5 Credits

High, medium, and low temperature refrigeration application, operation of mechanical and electrical components, service and repair of electrical circuitry, and mechanical components, capacity controls, walk-ins, reach-ins, ice machines, supermarket refrigeration equipment, refrigeration

piping, heat reclaim, and start-up procedures. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110 or consent of instructor (4 lecture hours, 2 lab hours)

Installation

HVACR 2220 - 3 Credits

Proper installation of heating, air conditioning and refrigeration systems, piping, duct installation, electrical circuitry, and accessories. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100 and 1105 or consent of instructor (2 lecture hours, 2 lab hours)

Troubleshooting Systems

HVACR 2225 - 3 Credits

Systematic evaluation of system pressure, temperature, compressor efficiency, mechanical, and electrical components. Study of system performance on live equipment. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 2202 and 2210 or consent of instructor (2 lecture hours, 2 lab hours)

Advanced Controls

HVACR 2230 - 3 Credits

Heating, Ventilation and Air Conditioning (HVAC) control systems in commercial buildings, including electric, pneumatic, electronic and Direct Digital Control (DDC) controls. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110 or consent of instructor (2 lecture hours, 2 lab hours)

Direct Digital Control of HVAC Systems

HVACR 2231 - 3 Credits

Examines state-of-the-art heating, ventilating, air conditioning (HVAC) Direct Digital Control (DDC) systems. Emphasis is on system configurations, applications, installation, and troubleshooting. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 2230 with a grade of C or better or equivalent, or consent of instructor (2 lecture hours, 2 lab hours)

Energy Audits/Economics

HVACR 2232 - 2 Credits

Purpose, objectives and mechanics of the energy audit and economic processes include the audit procedures, heating, ventilation, air conditioning, and refrigeration systems, lighting, auxiliary

equipment, energy conserving, cost-saving measures and analysis techniques that are necessary for evaluation of energy projects. After successful completion of the course, students are eligible to take the Environmental Protection Agency (EPA) Refrigerant Certification Test. (1 lecture hour, 2 lab hours)

Central Cooling Plants

HVACR 2236 - 3 Credits

Theory of centrifugal, absorption and screw systems, minor repairs, service, preventive maintenance of pumps, air-handling equipment and controls are covered. Field trips to central cooling plants are included. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110 or equivalent. (2 lecture hours, 2 lab hours)

Load Calculations and Duct Design

HVACR 2240 - 5 Credits

Techniques and procedures necessary to evaluate residential and commercial heat loss, heat gain and duct layout design. Heat transmission, infiltration, R-value, U-valve, duct analysis, duct sizing, duct and register location and selection, and equipment sizing and selection. (4 lecture hours, 2 lab hours)

Industrial Air Conditioning Design

HVACR 2241 - 3 Credits

Design and application of industrial air conditioning, psychrometrics, load calculation, equipment selection, ventilation, duct design, pipe design, and automatic controls: Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, Heating, Ventilation, Air Conditioning and Refrigeration 1105, Heating, Ventilation, Air Conditioning and Refrigeration 2240 and Mathematics 1100 or Mathematics 1115 (or college equivalent) or qualifying score on the mathematics placement test, or consent of instructor (2 lecture hours, 2 lab hours)

System Balancing

HVACR 2250 - 2 Credits

Covers air-delivery equipment, duct distribution, duct pressure, cubic feet per minute, fluid flow, pumps, piping, refrigeration systems, testing instruments, and fine tuning of systems. Prerequisite: Heating, Ventilation, Air Conditioning and Refrigeration 1100, 1105 and 1110, all with a grade of C or better or consent of instructor (1 lecture hour, 2 lab hours)

Heating and Air Conditioning Contracting

HVACR 2260 - 3 Credits

Principles of Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) contracting. Includes estimating, vendor selection, and sales development in the context of starting and growing an HVACR business. (3 lecture hours)

Internship (Career &Technical Ed)

HVACR 2860 - 1-4 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship (career & Technical Ed)

HVACR 2862 - 2 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship Advanced (Career & Tech Ed)

HVACR 2865 - 1-4 Credits

Continuation of Internship (Career & Technical Ed). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.