HEATING, VENTILATION, AIR COND (HVA)

HVA 101 - Refrigeration Fundamentals (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Introduces vocabulary, concepts and scientific principles used in the refrigeration and air conditioning industry. Studies theories on heat laws, pressures, matter and energy; examines refrigerant chemistry and the refrigeration cycle. Covers proper refrigerant management techniques and safe practices. Emphasizes practical application, troubleshooting techniques, measuring and testing the operation of the basic refrigeration cycle; includes working with ACR copper tubing, tools and instruments. Prerequisite: MTH 100, MTH 101 or higher.
Start Smart
Typically offered: Fall, Spring, Summer

HVA 102 - Refrigeration Systems (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 101. Introduces specialized system controls and accessories found in commercial refrigeration systems. Covers pressure and temperature controls, water-cooled condensers, commercial defrosting, and piping practices. Emphasizes practical application to develop diagnostic and troubleshooting techniques, interpret wiring diagrams, service, and repair including working with zero ODP refrigerants used in cmmercial systems application. Prerequisite: HVA 101 with a grade of C or better.
Typically offered: Fall, Spring, Summer

HVA 103 - Heating Principles (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Introduces vocabulary, concepts and scientific principles used in the heating industry. Studies heat laws, heat transfer, and examines fundamentals of the combustion process. Covers gas, oil and electric forced-air systems for residential comfort heating. Emphasizes practical application for testing and adjusting system performance, troubleshooting electrical systems and control, working with gas pipe, preventative maintenance, service and repair. Prerequisite: MTH 100, MTH 101 or higher.
Start Smart
Typically offered: Fall, Spring, Summer

HVA 104 - Residential Comfort Systems (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 101, HVA 103 and HVA 105. Incorporates additional system accessories and controls used to improve indoor air quality (IAQ). Examines psychrometrics principles, air flow measurements and basic residential air distribution systems. Emphasizes installation of residential HVAC systems, accessories and controls; includes basic concepts of duct design, sheet metal fabrication and installation. Prerequisite: Prior or concurrent enrollment in HVA 103 (Heating Principles) with a grade of C or better, or consent of coordinator.
Typically offered: Fall, Spring, Summer

HVA 105 - Heating and Cooling Controls (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Introduces electrical principles and concepts, electrical safety, electrical controls and electrical wiring diagrams utilized in residential and light commercial HVAC systems. Covers electrical symbols, Ohms' Law, series and parallel circuits, power distribution, magnetism, transformers, switches, relays, contactors, AC motors, motor starters and capacitors. Emphasizes the practical application for electrical system diagnosing; measuring volts, ohms and amps; troubleshooting testing and adjusting electrical controls; interpreting wiring schematics; and wiring electrical circuits. Prerequisite: MTH 100, MTH 101 or higher.
Typically offered: Fall, Spring

HVA 106 - Pneumatic Controls Systems (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 105. Introduces pneumatic system controls and accessories found in commercial heating and air conditioning systems, and variable/constant air volume air handling units. Covers pneumatic relays, dampers, valve actuators, controller receivers, temperature and humidity controls, and air compressors. Emphasizes practical application to develop diagnostic and troubleshooting techniques, focusing on interpreting pneumatic diagrams, testing and measuring system components, service, repair and installation; and introduces commercial heating and cooling systems. Prerequisite: HVA 105 with a grade of c or better.
Typically offered: Spring

HVA 107 - Commercial Air Conditioning Systems (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 101, HVA 105 and HVA 106. Focuses on air conditioning systems used in commercial buildings and their applications. Studies direct expansion systems, package units, and chilled-water systems. Covers rooftop units, variable refrigerant flow systems, air handling units, chillers and cooling towers. Emphasizes practical application to develop troubleshooting techniques, perform system diagnostic/installation/preventive maintenance service and repairs. Includes fundamentals of air conditioning absorbers. Prerequisite: HVA 101, HVA 105 and HVA 108 with grades of C or better, and prior or concurrent enrollment in HVA 106 with a grade of C or better.
Typically offered: Spring

HVA 108 - Domestic Refrigeration Appliances (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 101 and HVA 105. Introduces the application of the refrigeration cycle in respect to small appliances. Covers refrigerators, air conditioning and fundamentals of heat pump operations. Reviews work-safe practices, electrical systems diagnostics, proper refrigerant handline and charging techniques, brazing and soldering copper tubing. Emphasizes practical application, operation, installation, maintenance, service and repair. Prerequisite: HVA 101 with a grade of C or better, and concurrent or prior enrollment in HVA 105 with a grade of C or better.
Typically offered: Fall, Spring, Summer

HVA 109 - Commercial Heating Systems (3 Credits)
2 lecture, 2 lab, 4 total contact hours
Builds on concepts learned in HVA 103, HVA 105 and HVA 106. Introduces low pressure steam and hot water boilers used in commercial heating. Studies heat laws, heat transfer theories, and examines the combustion process of gas, oil and coal. Covers boiler construction, boiler safe operating practices, pressure controls, and steam systems' accessories. Includes hydronic piping systems, circulating pumps and water treatment. Emphasizes practical application for boiler operation, preventive maintenance and service. Prerequisite: HVA 103, HVA 105 and HVA 106 with grades of C or better.
Typically offered: Spring

HVA 110 - Blueprints and Plans for HVAC (2 Credits)
2 lecture, 1 lab, 3 total contact hours
Provides an introduction to architectural blueprints and mechanical drawings specific to HVAC systems. Examines types of construction, construction materials and working drawings. Emphasizes reading and interpreting architectural prints and mechanical drawings used in residential and commercial building. Covers mechanical, air distribution, electrical and plumbing systems. Includes an introduction to load calculations. Prerequisite: Prior or concurrent enrollment in HVA 107 and HVA 109 with grades of C or better.
Typically offered: Fall

HVA 200 - HVAC/R Mechanical Codes and Standards (2 Credits)
2 lecture, 1 lab, 3 total contact hours
Examines HVAC systems code requirements for residential and light commercial buildings. Includes application of energy conservation standards, principles of building inspections, and proper equipment installation practices to discern code violations. Emphasizes practical application of safe practices, equipment layout, minimum installation requirements and legal ramifications for code violations. Prerequisite: HVA 110 with a grade of C or better.
Typically offered: Spring

HVA 201 - Refrigeration System Design (2 Credits)
1 lecture, 2 lab, 3 total contact hours
Builds on concepts learned in HVA 101, HVA 102 and HVA 108. Examines the thermodynamic properties of refrigerants and their application for refrigeration system design. Covers factors in the selection of systems components including compressors, evaporators, condensers, metering devices and accessories used in commercial refrigeration systems. Studies the application of refrigerant line sizing selection. Prerequisite: HVA 102 and HVA 108 with grades of C or better.
Typically offered: Fall, Spring, Summer

HVA 203 - Load Calculations (2 Credits)
2 lecture, 1 lab, 3 total contact hours
Studies methods used to calculate heat loss and heat gain for residential and light commercial structures to use to determine heating and cooling loads. Examines outdoor design temperature conditions, location, infiltration loads, composite material U-values and R-values. Emphasizes practical application for calculating building loads for equipment selection by performing load calculation using charts and data analysis from the Air Conditioning Contractors of America Manual J, abridged edition. Prerequisite: HVA 110 with a grade of C or better.
Typically offered: Fall

HVA 204 - Air Distribution (2 Credits)
1 lecture, 2 lab, 3 total contact hours
Studies priorities of air flow for residential and light commercial structures to design HVAC duct systems for efficient air distribution. Covers duct sizing principles, air distribution systems, duct materials, system performance, blower performance, and grill selection. Emphasizes practical application for residential duct sizing by using charts and data analysis from the Air Conditioning Contractors of Americia Manual D. Includes performing duct testing and air balancing procedures. Prerequisite: Prior or concurrent enrollment in HVA 203 with a grade of C or better.
Typically offered: Spring

HVA 205 - Customer Service and Support (1 Credit)
1 lecture, 0 lab, 1 total contact hours
Examines strategies to improve communication skills to make a positive first impression, and to provide customer service excellence with urgency and empathy in every customer interaction. Focuses on the importance of displaying good manners, maintaining a positive attitude and professional appearance. Emphasizes the development of strong communication skills to address customer inquiries by listening, answering questions and providing explanations in non-technical terms.
Typically offered: Spring