

# AIR CONDITIONING AND REFRIGERATION (ACR)

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## ACR 100 (3 credit hours)

### Refrigeration Fundamentals

Introduces refrigerant piping and fundamentals of refrigeration including environmental issues associated with HVAC. Lecture: 3 credits (45 contact hours).

**Co-requisite:** ACR 101.

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 101 (2 credit hours)

### Refrigeration Fundamentals Lab

Introduces fundamentals of refrigeration including environmental issues associated with HVAC and refrigerant piping. Develops proper hands-on techniques in the servicing and troubleshooting of basic systems. Stresses proper use and care of tools, equipment, materials, and safety. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** ACR 100.

**Attributes:** Technical

**Components:** LAB: Laboratory

## ACR 102 (3 credit hours)

### HVAC Electricity

Introduces students to basic physics of electricity. Covers Ohm's law; measuring resistance, voltage, ohms, watts and amps; constructing various types of electrical circuits; selecting wire and fuse sizes; and troubleshooting an electric motor and motor controls. Lecture: 3 credits (45 contact hours).

**Co-requisite:** ACR 103.

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 103 (2 credit hours)

### HVAC Electricity Lab

Introduces students to basic physics of electricity. Provides for application of Ohm's law; and measure resistance, voltage, ohms, watts and amps; construct various types of electrical circuits; select wire and fuse sizes; and learn to troubleshoot an electric motor and motor controls. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** ACR 102.

**Attributes:** Technical

**Components:** LAB: Laboratory

## ACR 112 (3 credit hours)

### Sheet Metal Fabrication

The student will learn to make patterns and lay out and construct common sheet metal duct fittings. Lecture: 3 credits (45 contact hours).

**Co-requisite:** ACR 113.

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 113 (2 credit hours)

### Sheet Metal Fabrication Lab

Provides lab time for students to lay out, cut, construct, and install common sheet metal duct fittings. Laboratory: 2 credits (60 contact hours).

**Co-requisite:** ACR 112.

**Attributes:** Technical

**Components:** LAB: Laboratory

## ACR 130 (3 credit hours)

### Electrical Components

Defines the electrical components of an air conditioning system. Includes different types of line voltages, wiring diagrams and solid state devices.

Emphasizes safety. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** ACR 102 with a grade of C or greater.

**Co-requisite:** ACR 131.

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 131 (2 credit hours)

### Electrical Components Lab

Permits practice using different types of line voltages, reading wiring diagrams, and using solid state devices. Emphasizes safety. Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** ACR 102 with a grade of C or greater.

**Co-requisite:** ACR 130.

**Attributes:** Technical

**Components:** LAB: Laboratory

## ACR 170 (3 credit hours)

### Heat Load/Duct Design

Introduces fundamentals needed to calculate heat gain and heat loss, thereby determining air conditioner/furnace size which will be used to calculate the correct duct size. Lecture: 3 credits (45 contact hours).

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 200 (3 credit hours)

### Commercial Refrigeration

Develops techniques for servicing and troubleshooting mechanical and electro-mechanical refrigeration components. Emphasizes electrical and refrigeration safety. Covers proper tool use and environmentally sound refrigerant handling. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** (ACR 100 and ACR 101) with a grade of C or greater.

**Co-requisite:** ACR 201.

**Attributes:** Technical

**Components:** LEC: Lecture

## ACR 201 (2 credit hours)

### Commercial Refrigeration Lab

Provides techniques in servicing and troubleshooting mechanical and electro-mechanical refrigeration components. Emphasizes electrical and refrigeration safety. Covers proper tool use and environmentally sound refrigerant handling. Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** (ACR 100 and ACR 101) with a grade of C or greater.

**Co-requisite:** ACR 200.

**Attributes:** Technical

**Components:** LAB: Laboratory

## ACR 206 (5 credit hours)

### Boilers

Develops techniques for servicing, troubleshooting and performing preventive maintenance on steam generating systems. Emphasizes electrical and steam safety. Covers proper tool and instrument use and practices for the efficient applications on steam systems used in commercial and industrial settings. Lecture: 3 credits (45 contact hours). Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** ACR 102 and ACR 103.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**ACR 207 (5 credit hours)****Commercial HVAC Systems**

Develops techniques for servicing, troubleshooting and performing preventive maintenance on commercial HVAC systems. Emphasizes electrical and mechanical safety. Covers tools and instruments used in installing, troubleshooting, and performing preventive maintenance on commercial HVAC systems. Lecture: 3 credits (45 contact hours). Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** (ACR 100 and ACR 101 and ACR 102 and ACR 103) or Consent of the Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**ACR 208 (4 credit hours)****Chillers**

Develops techniques for servicing, troubleshooting and performing preventive maintenance on high-pressure, low-pressure and absorption chilled water systems. Emphasizes electrical and safety. Covers proper tool and instrument use and practices for the efficient applications on chilled water systems used in commercial and industrial settings. Lecture: 3 credits (45 contact hours). Laboratory: 1 credit (30 contact hours).

**Pre-requisite:** ACR 100 and ACR 102 and ACR 103.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**ACR 209 (4 credit hours)****Manual N Commercial Load Calculation and Design**

Covers fundamentals needed to calculate heat gain and heat loss for commercial buildings. Introduces design conditions, solar heat gain, ventilation, internal heat gains, psychometrics and distribution systems for air conditioning and heating, thereby determining the correct size of equipment needed for different commercial buildings. Lecture: 4 credits (60 contact hours).

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 210 (3 credit hours)****Ice Machines**

Introduces operation, checking, adjusting and troubleshooting commercial ice makers. Covers adjusting, checking, cleaning and troubleshooting commercial ice machines. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** (ACR 100 and ACR 102) with a grade of C or greater.

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 237 (5 credit hours)****Building Controls I**

Develops techniques for servicing, troubleshooting, and performing necessary maintenance on modern building control system devices. Emphasizes electrical and mechanical safety. Covers equipment used in building control systems. Lecture: 3 credits (45 contact hours). Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** ACR 100 and (ACR 102 or comparable electrical course) and 10 semester credit hours of Building Controls Technician technical electives or consent of instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**ACR 238 (5 credit hours)****Building Controls II**

Develops techniques for configuring, tuning and troubleshooting a networked building control system. Covers networked field equipment and central computer-controlled building control systems. Lecture: 3 credits (45 contact hours). Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** ACR 237 or content of instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory, LEC: Lecture

**ACR 250 (3 credit hours)****Cooling and Dehumidification**

Explains working characteristics of air conditioning units with air and water cooled condensers. Covers line, low voltage and pneumatic controls. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** (ACR 100 & ACR 101) with a grade of C or greater.

**Co-requisite:** ACR 251.

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 251 (2 credit hours)****Cooling and Dehumidification Lab**

Prepares the student for installing, servicing, and troubleshooting air conditioning systems with water and air cooled condensers and line and low voltage. Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** (ACR 100 & ACR 101) with a grade of C or greater.

**Co-requisite:** ACR 250.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 260 (3 credit hours)****Heating and Humidification**

Discusses principles of operation and application of heating systems from simple electric and fossil fuel furnaces through more complex systems such as oil burners, boilers, and hydronic systems. Concentrates on both line and control voltage circuitry pertaining to these systems. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** ACR 102 and 103 or EET 154 and 155 or ETT 112 and 113 or IMT 110 and 111 or consent from the instructor.

**Co-requisite:** ACR 262.

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 262 (2 credit hours)****Heating and Humidification Lab**

Provides lab time for application of troubleshooting, checking, adjusting, and installing heating units currently in use. Laboratory 2 credits (60 contact hours)

**Pre-requisite:** ACR 102 and 103 or EET 154 and 155 or ETT 112 and 113 or IMT 110 and 111 or consent from the instructor.

**Co-requisite:** ACR 260.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 270 (3 credit hours)****Heat Pump Application**

Explains reverse cycle heating systems, defrost cycles, reversing valves, and auxiliary heating. Concentrates on line and control voltage circuitry pertaining to these units. Lecture: 3 credits (45 contact hours).

**Pre-requisite:** [(ACR 100 and ACR 102) with a grade of C or greater] or Permission of Instructor.

**Co-requisite:** ACR 271.

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 271 (2 credit hours)****Heat Pump Application Lab**

Provides for application of troubleshooting, checking, adjusting, and installing reverse cycle units. Laboratory: 2 credits (60 contact hours).

**Pre-requisite:** [(ACR 100 and ACR 102) with a grade of C or greater] or Permission of Instructor.

**Co-requisite:** ACR 270.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 290 (3 credit hours)****Journeyman Preparation**

Includes lectures, discussions, and presentations pertaining to the proper application of HVAC codes. Prepares the student to pass the Kentucky Journeyman HVAC licensing exam. (This class should be taken at the end of the program.) Lecture: 3 credits (45 contact hours).

**Attributes:** Technical

**Components:** LEC: Lecture

**ACR 291 (1 credit hours)****Special Problems I**

A course designed for the student who has demonstrated specific special needs. Laboratory: 1 credit (45 contact hours).

**Pre-requisite:** Permission of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 293 (2 credit hours)****Special Problems II**

A course designed for the student who has demonstrated specific special needs. Laboratory: 2 credits (90 contact hours).

**Pre-requisite:** Permission of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 295 (3 credit hours)****Special Problems III**

A course designed for the student who has demonstrated specific special needs. Laboratory: 3 credits (135 contact hours).

**Pre-requisite:** Permission of Instructor.

**Attributes:** Technical

**Components:** LAB: Laboratory

**ACR 298 (2 credit hours)****Practicum**

Practicum provides supervised on-the-job work experience related to the student's education objectives. Students participating in Practicum do not receive compensation. Practicum: 2 credits (150 contact hours).

**Pre-requisite:** Permission of the Instructor.

**Attributes:** Technical

**Components:** PCM: Practicum

**ACR 299 (2 credit hours)****Cooperative Education Program**

Co-op provides supervised on-the-job work experience related to the student's educational objectives. Students participating in the Cooperative Education program receive compensation for their work. Co-op: 2 credits (150 contact hours).

**Pre-requisite:** Permission of the Instructor.

**Attributes:** Technical

**Components:** COP: Co-op