

# AIR CONDITIONING AND REFRIGERATION

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The air conditioning and refrigeration industry offers a bright future for people who wish to prepare for entry into this profession. This field includes sales, installation, maintenance, service and operation of equipment not only in residential settings, but also in commerce and industry. The need for air conditioning and refrigeration service technicians will continue to expand with the growth of computer applications into the industrial fields. This program also places emphasis on Green Technology initiatives and incorporates an emphasis on PV arrays and wind turbines.

The Air Conditioning and Refrigeration program at Arkansas Tech University-Ozark Campus is accredited by:

HVAC Excellence  
P.O. Box 491  
Mount Prospect, IL 6005 6  
telephone: (800) 394-5268  
website: [www.hvacexcellence.org](https://www.hvacexcellence.org) (<https://www.hvacexcellence.org>)

Arkansas Tech University-Ozark Campus offers a certificate of proficiency in air conditioning and refrigeration (16 hours), a technical certificate in air conditioning and refrigeration (36 hours), and an associate of applied science degree in air conditioning and refrigeration (60 hours) with an available option of Facilities Management, in a completely equipped shop. Students are required to take and pass the Environmental Protection Agency (EPA) Section 608 Certification Test and will earn a universal license. Students will also sit for Employment Ready (ER) Electrical, ER Air Conditioning, and ER Heat Pumps industry competency exams through HVAC Excellence prior to graduation.

The facilities maintenance/management program offers training in addition to the Air Conditioning and Refrigeration course work to enable graduates to pursue broader employment opportunities. Course work prepares students for careers in facilities maintenance fields. Students pursuing the Associate of Applied Science degree will be better prepared to pursue positions that will lead to promotion and management positions in the facilities fields.

Students pursuing a certificate of proficiency in construction technology or air conditioning and refrigeration may take classes concurrently with their regular high school studies and earn college credit, which will apply to the technical certificate and associate of applied science degree.

## Programs

- Air Conditioning & Refrigeration, Associate of Applied Science (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/air-conditioning-refrigeration-aas/>)
- Air Conditioning & Refrigeration, Associate of Applied Science - Facilities Management Option (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/air-conditioning-refrigeration-aas-facilities-management/>)

- Air Conditioning & Refrigeration, Certificate of Proficiency (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/air-conditioning-refrigeration-cp/>)
- Air Conditioning & Refrigeration, Technical Certificate (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/air-conditioning-refrigeration-tc/>)
- Air Conditioning & Refrigeration, Technical Certificate - Facilities Maintenance Option (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/air-conditioning-refrigeration-tc-facilities-maintenance/>)
- Construction Technology, Certificate of Proficiency (<https://catalog.atu.edu/ozark/programs/air-conditioning-refrigeration/construction-technology-cp/>)

## Courses

### Air Conditioning/Refrigeration

#### ACR 1203 Fundamentals of Electricity

The characteristics of alternating current, waves, phase relations, transfer action, electrical circuits, and its use with controls, motors, relays, including legends and symbols are taught. In addition, the student will study the wide variety of motors, single and three phase used in the air conditioning and refrigeration field. Ozark CTE General Technology

#### ACR 1205 Tubing and Piping

This course covers the process of identifying tubing and pipe with practical applications in sizing and fitting to different configurations using mechanical fittings and soldering. The history and development of air conditioning is also covered. Silver branding and aluminum soldering is also taught. Practical application is provided in the laboratory. Safety is emphasized. Ozark CTE General Technology

#### ACR 1222 Industrial Controls

Designed to teach the student how to set up a control system for different types of control requirements. Different types of control methods are studied, such as PLC, digital and microprocessor systems. Ozark CTE General Technology

#### ACR 1301 Industrial Safety in Air Conditioning and Refrigeration

The hazards associated with the different refrigerants, electricity, the oxy-acetylene torch, radon, carbon monoxide, extreme heat and extreme cold and ladder safety will be addressed. Ozark CTE General Technology

#### ACR 1302 Basic Compression and Refrigeration

A comprehensive study of mechanical refrigeration systems emphasizing proper service techniques through analysis of the problem. Testing procedures, parts removal and installation are covered in depth. Also included is a study of the computation of temperature - pressure relationship and related problems. This course is designated as "Green". Ozark CTE General Technology

#### ACR 1503 Electronic Components

The student will study the wide variety of motors used in the air conditioning and refrigeration field. In addition, various system controls, relays, resistors, contactors, and timers are concepts that will be taught as they relate to motors and their operation. Ozark CTE General Technology

#### ACR 1602 Schematics

The student will learn to read, draw, and interpret writing diagrams and to place the circuitry in operative arrangements with electrical and electronic symbols. System diagrams will be developed by the student for a wide variety of A/C equipment. Ozark CTE General Technology

### **ACR 2102 Residential Systems**

Prerequisite: ACR 1203 and ACR 1302.

This course is a study of the major components and control devices for gas and oil furnaces, hydronic systems, heat pumps, and cooling systems. Ozark CTE General Technology

### **ACR 2104 Heat Gain and Loss**

Prerequisite: ACR 1302.

A study of air properties and the instrumentation to meet the environmental needs of structures, residential and commercial, and the factors involved in the calculation of heating and cooling loads. Also included, is a study of the distribution mediums such as duct design and sizing. This course is designated as "Green". Ozark CTE General Technology

### **ACR 2112 Air Conditioning Service**

This course includes a comprehensive study of air conditioning systems which emphasizes proper service techniques through analysis of the problem. Testing procedures, parts removal, and installation are covered in depth. A study of the computation of temperature pressure relation and related problems is included. Environmental impacts and safety are emphasized, including Environmental Protection Agency certification. This course is designated as "Green". Ozark CTE General Technology

### **ACR 2114 Commercial Refrigeration**

Covers all aspects of using ammonia as a refrigerant. Describes both single-stage and two-stage ammonia systems. Explains the importance of accumulators and intercoolers in ammonia systems. Concludes with coverage of liquid recirculation system operation. Ozark CTE General Technology

### **ACR 2122 Occupational Safety and Health Administration-10**

### **ACR 2124 Sheet Metal**

Provides an introduction to safety, tools, machinery, materials, and fasteners used in the sheet metal trade. Ozark CTE General Technology

### **ACR 2134 Boiler Operations**

Will cover the basic theory, operation, and construction of a high pressure boiler. This course is designated as "Green". Ozark CTE General Technology

### **ACR 2994 SPECIAL TOPICS FOR AIR CONDITIONING AND REFRIGERATION**

This course is designed to introduce students to specific areas in Air Conditioning and Refrigeration. Course content and credit are designed to meet the needs of the student. The topic will vary from offering to offering; thus, the course may be taken more than once for a total of 6 hours. This course requires 15 clock hours per one semester credit hour. CTE General Technology

## **Facilities Maintenance/Management**

### **FAC 2102 Electrical Applications**

This class prepares individuals to apply technical knowledge and skills to install and repair residential electrical systems.

### **FAC 2104 Construction Fundamentals**

This class prepares individuals to apply technical knowledge and skills in the building, inspecting, and maintaining of structures and related properties.

### **FAC 2202 Carpentry**

Students will learn basic carpentry skills, power and hand tool safety, the proper use of power and hand tools, framing, trim, and hanging doors and windows. Also covered will be dry wall basics, painting, and basic masonry. Some cabinet making and architectural blueprint reading will be discussed.

### **FAC 2212 Plumbing**

Basic plumbing skills will be taught and will include: fixture repair and replacement; piping (water and gas piping); piping drops, angles, and sizes; and basic plumbing codes for commercial and residential facilities.

### **FAC 2222 Grounds Maintenance**

Landscape management, chemical usage and storage, MSDS file care, ADA compliance, and safety and reliability topics will be covered.

### **FAC 2303 Construction Laboratory I**

This course prepares individuals to apply technical knowledge and skills in the building, inspecting, and maintaining of structures and related properties.

### **FAC 2313 Construction Laboratory II**

A continuation of FAC 2303, this course prepares individuals to apply technical knowledge and skills in the building, inspecting, and maintaining of structures and related properties.