

**COURSE PREFIX:** ACR 108  
**COURSE TITLE:** Refrigeration Fundamentals  
**LEC HRS/ WEEK:** 2.0  
**LAB HRS/WEEK:** 3.0  
**CREDIT HRS/SEMESTER:** 3.0

[Distance Learning Attendance/VA Statement](#)  
[Textbook Information](#)

### **COURSE DESCRIPTION**

This course is an introduction to the principles of refrigeration.

### **COURSE COMPETENCIES**

Upon successful completion of this course, the student should be able to:

#### **Module 1: Introduction**

- Explain the history of air conditioning and refrigeration
- Determine career opportunities in the HVACR industry
- Describe the role of Trade organizations
- Define air conditioning and refrigeration

#### **Module 2: Theory of Heat**

- Define temperature
- Make conversions between Fahrenheit and Celsius scales
- Describe molecular motion at absolute zero
- Define the British Thermal Unit
- Describe heat flow between substances of different temperatures
- Explain the transfer of heat by conduction, convection, and radiation
- Discuss sensible heat, latent heat and specific heat
- State atmospheric pressure at sea level and explain why it varies at different elevations
- Describe two types of barometers
- Explain psig and psia as they apply to pressure measurements

#### **Module 3: Matter and Energy**

- Define matter
- List the three states in which matter is commonly found
- Define density
- Discuss Boyle's Law
- State Charles' Law
- Discuss Dalton's Law as it relates to the pressure of different gases
- Define specific gravity and specific volume
- State two forms of energy important to the air conditioning (heating and cooling) and refrigeration industry
- Describe work and state the formula used to determine the amount of work in a given task
- Define horsepower
- Convert horsepower to watts
- Convert watts to British Thermal Units

## **Module 4: Refrigeration and Refrigerants**

- Discuss the mechanical compression cycle
- Discuss applications for high-, medium- and low-temperature refrigeration
- Describe the term *ton of refrigeration*
- Describe the basic refrigeration cycle
- Explain the relationship between pressure and the boiling point of water or other liquids
- Describe the function of the evaporator or cooling coil
- Explain the purpose of the compressor
- List the compressors normally used in residential and light commercial buildings
- Discuss the function of the condensing coil
- State the purpose of the metering device
- List four characteristics to consider when choosing a refrigerant for a system
- List the designated colors for refrigerant cylinders for various types of refrigerants
- Describe how refrigerants can be stored or processed while refrigeration systems are being serviced
- Plot a refrigeration cycle for refrigerants (R-22, R-410A, R-134A) on a pressure/enthalpy diagram

### **STANDARDS**

Assignments and attendance must be completed as designated in “Evaluation Strategies/Grading.”  
Criteria for minimal acceptable performance will be provided by the instructor.

### **REQUIREMENTS**

#### **Attendance Policy**

The college attendance policy stated in the college handbook will be honored. The instructor will provide specific requirements for the course.

#### **Academic Honesty**

Students are expected to adhere to the college policy regarding student conduct as stated in the college handbook.

#### **Assignments**

Students are expected to complete all assignments and any supplementary exercises designated by the instructor.

### **EVALUATION STRATEGIES/GRADING:**

Students must complete all modules, including assignments, projects, labs, and tests. Students must earn at least a “C” in order for the course to serve as a prerequisite and for the course to apply towards a certificate.

#### **Grading Scale:**

- A = 90 – 100
- B = 80 – 89.9
- C = 70 – 79.9
- D = 60 – 69.9
- F = 00 – 59.9

**Evaluation Method:**

Tests/Projects (minimum of one)	8% of Module One <u>+2%</u> of Module One 10%	
Tests/Projects (minimum of three total) Work Attitude	25% of Module 2-4 <u>+5%</u> of Module 2-4 30%	
	10%	Module One
Plus	<u>30% (X 3)</u>	Modules 2-4
	100%	Final Grade

Work Attitude is defined as:

- |               |                     |
|---------------|---------------------|
| Participation | Responsibility      |
| Cooperation   | Professionalism     |
| Appearance    | Attendance          |
| Effort        | Self Motivation     |
| Safety        | Works Independently |

**ENTRY-LEVEL SKILLS:**

The student must be able to read and solve basic mathematical equations.

**PREREQUISITES:** RDG 031 or equivalent, ACR 102

**CO-REQUISITES:** None

**METHODS OF INSTRUCTION**

Lectures, reading assignments, projects, discussions, video presentations, multi-media presentations, and web content are the major teaching methods used in this course. See instructor for specifics.

**Disabilities Statement:** Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.