

## **COURSE INFORMATION**

COURSE PREFIX/NO: ACR 110  
COURSE TITLE: HEATING FUNDAMENTALS  
LEC HRS/WEEK: 3.0  
LAB HRS/WEEK: 3.0  
CREDIT HRS/SEMESTER: 4.0

[DL ATTENDANCE/VA STATEMENT](#)  
[TEXTBOOK INFORMATION](#)

## **COURSE DESCRIPTION**

This course covers the basic concepts of electric, gas, and oil heat, their components and operation.

## **COURSE COMPETENCIES**

Upon successful completion of this course, the student should be competent to perform the following tasks:

1. Maintain and service different types of heating equipment: oil, gas, and electric furnaces
2. Know by name and function the different types of controls and components of each type of heating equipment
3. Troubleshoot and repair the electrical and mechanical components of each type of heating system

## **MINIMAL STANDARDS**

### A. Oil Heat

Given an operating oil furnace, the student will select the right type of fuel oil and set the correct combustion according to manufacturer's specifications. The student will be tested by the use of the CO<sub>2</sub> analyzer so that efficiency of the furnace is equal to or greater than that specified by the manufacturer.

Given the various operating parts of an oil furnace, the student will disassemble these parts and reset them to function properly as to ignition, fan on and off settings, limit cutouts, atomization of the oils and combustion air controls. The student will be tested orally and by written test on the different parts of the oil burner and how each part operates. The student must obtain a minimum grade of 70%.

### B. Gas Heat

Given the parts of the gas furnace, the student will test each part for proper operation and safety of operation. He will troubleshoot the gas valve, air/gas mixture, ignition, time delay controls, safety controls, and all electrical wiring. The student will be tested by written test on the different parts of the gas furnace and how each part operates. The student must obtain a minimum grade of 70%.

### C. Electric Heat

Given the parts of an electric furnace, the student will ohm (with an ohm meter) the elements, safety switches, and temperature switches. The student will be tested on electric furnace parts identification and troubleshooting pertaining to heat strips, controls, and limits. The student will be tested by using the ohm-volt and amp meter to identify a problem simulated the instructor within a time period specified by the instructor. The student must obtain a minimum grade of 70%.

D. Work Attitudes

Given guidelines of acceptable work behavior by the instructor, the student will exhibit proper work attitudes at all times. See Evaluation Strategies/Grading of this outline for additional details.

**COURSE REQUIREMENTS (i.e., attendance, academic honesty)**

Students are responsible for attaining competencies through completion of the following course requirements:

Attendance

Students will be bound by the policies stated in the York Technical College Student Handbook. "Students must attend 80% of the hours assigned the class for a semester to receive credit for the course." In addition to this requirement, attendance will constitute 10% (100 pts) of the course grade. Every 1 hour of absence will result in the loss of 1.1 points. The instructor may, at his discretion, waive the loss of points for excused absences; however, all absences both excused and unexcused count towards the 20% maximum.

In case a student does miss a class, the student is responsible for obtaining the material that was covered during the absence.

If a student is aware that a class will be missed, then the student should notify the instructor at the earliest possible date.

If a student misses a test because of illness or urgent emergency, it is the responsibility of the student to:

1. Notify the instructor prior to the class period, or at the earliest possible date. At that time a new date for a make-up test can be rescheduled.
2. Students with unexcused absences during tests will be allowed to take a make up test at the discretion of the instructor.
3. The student has the burden to make sure that some arrangement was made with the instructor for taking a make up test

Participation in Class Discussion

Completing assigned homework, lab experiments, and reports and tests

Laboratory Requirements

The student will complete lab assignments issued by the instructor.

Academic Honesty

"York Technical College adheres to the South Carolina TECH Student Code, approved in State Board for Technical and Comprehensive Education on March 13, 1974 (revised last April 25, 1984). Copies of this code are available in the Library and from Student Services... Any student caught cheating or involved in any other academic dishonesty will be given a grade of zero and will be subject to further disciplinary action."

**EVALUATION STRATEGIES/GRADING**

The grading scale will be as follows:

Grade	Points
A	900-1000
B	800-899
C	700-799
D	600-699
F	0-599

Evaluation Method	Total Points
Tests (minimum 3)	600
Laboratory	250
Electric heat	100
Gas heat	100
Oil heat	50
Attendance	100
Work attitude	50
1. Participation (10)	
2. Cooperation (10)	
3. Safety (10)	
4. Self Motivation (10)	
5. Works Independently (10)	
Total Points	1000

### **ENTRY LEVEL SKILLS**

The student must be able to demonstrate the use of volt meters and amp meters in electrical troubleshooting

### **PREREQUISITES**

RDG 031 or equivalent

### **CO-REQUISITES**

None

### **TOPIC CONTENT OUTLINE**

- A. Overview of electric, gas, and oil heating equipment
- B. Equipment parts
- C. Equipment controls
- D. Safety controls
- E. Equipment troubleshooting

### **LABORATORY EXPERIMENTS**

- A. Disassembly of a particular type of heating equipment
- B. Troubleshooting to determine cause of malfunction
- C. Removal and repair or replacement of faulty part.

### **METHODS OF INSTRUCTION**

This course consists of 3 hours of class periods and 3 hours of laboratory. The class instruction includes lectures, demonstrations, discussions, and tests. The lectures are given while drawing on the blackboard, using overhead projections, or videotapes.

The lab experiments are assigned by the instructor and may be performed on equipment in the shop or on equipment brought in for repair.