

Course Objectives/Course Outline
Spokane Community College

Course Title: Fundamentals of Heating & Mechanical Systems

Prefix and Course Number: AIRC 108

This course introduces the fundamentals of heating with forced air fuel gas burning appliances. Other fuel gas appliances are introduced, and the combustion process, as it relates to heating equipment is explored. Gas codes will be introduced with proper venting and piping techniques. Sequence of operation and troubleshooting will be covered in detail.

Course Learning Outcomes:

By the end of this course, a student should be able to:

- determine the types of fuel gases by their properties
- select the appropriate fuel gas for a given application
- explain fuel to air ratios as it relates to proper controlled combustion
- demonstrate the ability to recognize complete and incomplete combustion
- determine combustion efficiency
- identify possible products of incomplete combustion
- make comparisons between and among fuels in reference to costs
- define methods of heat transfer
- explain the heat triangle
- categorize fuel gas burning appliances
- identify the types of ignition systems on fuel gas burning equipment
- explain the sequence of operation of an 80% spark ignition furnace
- demonstrate the ability to troubleshoot a problem to failed component using proper techniques and procedures
- demonstrate the ability to properly size gas piping for specific installations
- properly size and select proper venting materials for installation
- take and pass the Mechanic I exam given by the City of Spokane

Course Outline:

- I. Properties of Fuel Gases
 - A. Comparison of Fuel Gases
- II. The combustion Process
 - A. Effects of Fuel to Air Ratio on Combustion
 - B. Analysis of Products of Combustion
- III. Gas Appliance Categories
 - A. 70% Furnaces
 - B. 80% Furnaces
 - C. 90% Furnaces
- IV. Ignition Systems
 - A. Standing Pilot
 - B. Spark Ignition
 - C. Hot Surface Igniter
- V. Sequence of Operation
 - A. Ignition Source Sets
 - B. Trouble Shooting
 - C. Diagnoses and Repair

- VI. Gas Piping
 - A. Piping for System Sizing
 - B. Gas Piping Installation
- VII. Venting
 - A. Different Types of Venting
 - B. Size Venting and Installation
- VIII. Mechanics I
 - A. Codes Application Under 400,000 BTUs
 - B. Mechanics I Oral and Written Exams