

Course Objectives/Course Outline

Spokane Community College

Course Title: Theory of Heat Transfer

Prefix and Course Number: AIRC 117

Students explore basic concepts and applications of force, energy, fluids and heat as applied to refrigeration and air conditioning. Topics include: energy, heating and air conditioning equipment, thermal heat properties, the basic refrigeration cycle and test equipment and tools of the trade.

Course Learning Outcomes:

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

- follow and observe all safety precautions
- identify fundamental concepts of heating and cooling
- expand vocabulary in use and understanding of heating and cooling terminology
- explain the theory of heat transfer
- explain the theory of matter and energy
- apply and use Gas Laws
- identify the components and their function of a gas furnace
- identify the components and their function of an electric forced air furnace
- identify the components and their function of a refrigeration system
- explain the theory of operation of a basic refrigeration system
- use proper tools to do piping and soldering
- demonstrate the proper use of test equipment

Course Outline:

- I. Occupation Safety
 - A. Terms and definitions
 - B. Personal Lab Safety
 - C. General Shop Safety
 - D. Machine Safety.
 - E. Solvent and Chemical Safety
 - F. Workplace Electrical Safety
 - G. Characteristics of a Clean and Orderly Shop
 - H. Types of Fires and Extinguishing Agents
 - I. Guidelines for Handling an Accident
 - J. Circuit Amperage and its Affects on the Human Body
 - K. Safety Guidelines for Using Electrical Tools
 - L. Hazard Communications Standard
 - M. Lifting Safety

- II. Theory of Heat Transfer
 - A. Comfort
 - B. Temperature
 - C. Types of Heat Transfer
 - D. Sensible and Latent Heat
 - E. Matter and Energy
 - F. Matter
 - G. Mass and Weight
 - H. Density and Specific Gravity

- I. Specific Volume
- J. Gas Laws
- K. Energy

- III. Refrigeration
 - A. Refrigeration Components
 - B. Refrigeration Cycle
 - C. Refrigerant and Oil Management
 - D. Measuring System Pressure Using Refrigeration Gages
 - E. Using P-T Charts and Measured Temperature to Figure Super Heat and Sub-Cooling

- IV. Tubing and Piping
 - A. Purpose
 - B. Types and Sizes of Tubing
 - C. Techniques of Cutting, Bending, Swaging, and Soldering Tubing
 - D. Piping Types and Sizes
 - E. Techniques of Cutting, Threading, and Assembling Pipe
 - F. PVC Piping Types and Sizes
 - G. Techniques of Cutting and Assembling PVC Piping

- V. Gas Forced Air Furnace
 - A. Parts of the Furnace and their Function
 - B. Multiple Use of Thermocouples
 - C. Multiple Use of Flame Currents
 - D. Use of Water Manometers
 - E. Amp Clamps and Amp Draw on Blower Motors
 - F. BTU Output Calculations

- VI. Electric Forced Air Furnace
 - A. Furnace Parts and their Function
 - B. Input Voltage Measurement