

I. CATALOG DESCRIPTION:

A. Department Information:

Division: Refrigeration and Air Conditioning
Department: Refrigeration and Air Conditioning
Course ID: REFRIG 055A-Z
Course Title: Refrigeration Heating I
Units: 3
Lecture: 3 Hours
Prerequisite: None

- B. Course and Schedule Description: This is the first term of a three-term national training course offered in conjunction with the Refrigeration Service Engineers Society and is a comprehensive study of heating systems. This course is designed to help certify journeymen-level refrigeration technicians and keep their knowledge current. Department Advisory: HVAC Refrigeration work experience

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of this course, students will be able to:

- A. Debate the principles of heat, heat flow, and loss factor
- B. Compare the different heating fuels
- C. Analyze room air distribution
- D. Describe steam heating and piping systems
- E. Identify radiant heating systems
- F. Distinguish between humidification and filtering.

IV. CONTENT:

- A. Introduction
 - 1. Introduction to the concept of heat
 - 2. Principles of heating
 - 3. Principles of heat flow
 - 4. Heat loss factors
 - 5. Heat loss from structures
 - 6. Combustion
 - 7. Heating fuels: gas
 - 8. Heating fuels: solid fuels, fuel oil
 - 9. Heating fuels: electricity
- B. Gas Burners
 - 1. Oil burning equipment
 - 2. Oil burner and accessories
- C. Electric Heat
 - 1. Electric resistance heating
 - 2. Electric heat pumps
- D. Warm Air Heat
 - 1. Ducted warm air systems
 - 2. Room air distribution
- E. Water Heating
 - 1. Introduction to hydronic heating (water)
 - 2. Boilers and heat distributing units
 - 3. Hot water specialties and controls
 - 4. Hydronic heating piping systems
 - 5. Hydronic zone control pumps

- 6. Hot water supply systems
- F. Steam Heat
 - 1. Introduction to hydronic heating (steam)
 - 2. Boilers (steam) and heat distribution units
 - 3. Steam traps
 - 4. Steam specialties
 - 5. Steam piping
- G. Heating Systems
 - 1. Radiant heating systems
 - 2. Heat reclamation equipment
 - 3. Humidification
 - 4. Filtering
 - 5. Review of safety and codes

V. METHODS OF INSTRUCTION:

Methods of instruction will vary from instructor to instructor but may include:

- A. Lectures and discussions about heat flow, heating fuels, air distribution, heating types, humidification and filtering.
- B. Lectures and discussions are complemented with handouts and instruction on different methods of analysis and troubleshooting.
- C. Dynamic are accented with the use of graphs and videos.
- D. Homework is assigned to promote expertise, vocabulary, and writing skills.

VI. TYPICAL ASSIGNMENTS:

Typical assignments will vary from instructor to instructor but may include:

- A. Identify the components in a forced air gas furnace
- B. Explain the method and sequence of operation of a gas furnace
- C. Differentiate between a standing pilot and electric ignition system

VII. EVALUATION:

A. Methods of evaluation will vary from instructor to instructor but may include:

- 1. Written tests
- 2. Final exam

Typical Questions:

- a. Explain the principles of heat, heat flow, and loss factor.
- b. What is heat?

B. Frequency of evaluation will vary from instructor to instructor but may include:

- 1. Three (3) written tests
- 2. One (1) final exam

VIII. TYPICAL TEXT:

Refrigeration Service Engineers Society, RSES Total Heating, Refrigeration Service Engineers Society, Des Plaines, IL, 2002 (*The Refrigeration Service Engineers use their own book.*)

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None