

I. CATALOG DESCRIPTION:

A. Department Information:

Division: Refrigeration and Air Conditioning
Department: Refrigeration and Air Conditioning
Course ID: REFRIG 062A-Z
Course Title: Refrigeration and Air Conditioning Electricity III
Units: 3
Lecture: 3 Hours
Prerequisite: None

- B. Course and Schedule Description: This is the third term of a three-term national training course offered in conjunction with the Refrigeration Service Engineers Society and is a comprehensive study of solid state and electrical control circuits. 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. Examine the fundamentals of electro-mechanical and solid state electronics.
- B. Compare solid state components and controls.
- C. Evaluate electrical control circuits.
- D. Review the National Electrical Code Manual.
- E. Apply solid state instruments and select their use.
- F. Test Honeywell, Westinghouse, and Carrier control circuits.

IV. CONTENT:

- A. Thermoelectric Refrigeration
 - 1. Electro-mechanical proportional controls
 - 2. Basic electronics
- B. Solid State
 - 1. Components and circuits
 - 2. Solid state fundamentals
 - 3. Modern recording instruments
 - 4. Amprobe
- C. Solid State Controls
 - 1. Lube-oil protection controls
 - 2. AC circuits and wiring methods
 - 3. Basic control theory
 - 4. Electric control circuits
 - 5. Residential air conditioning controls
 - 6. Cooling controls
- D. Electrical Code
 - 1. National
 - 2. Local
- E. Control Circuits and Diagrams
- F. Electric Modutrol Motor
- G. Total Comfort Systems
- H. Operational Sequence Examples and Wiring Diagrams
 - 1. Commercial weathermaker control circuits
 - 2. Heat pump - electrical components troubleshooting
 - 3. Multi-zone units

V. METHODS OF INSTRUCTION:

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

- A. Lectures and discussions about electro-mechanical and solid-state devices, controls, control circuits, tools and instruments, and operational sequences.
- B. Lectures and discussions are complemented with handouts and instruction on devices and their use.
- C. Dynamics are accented with the use of pictures, charts 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. Describe the difference between alternating current and direct current.
- B. Explain the fundamentals of solid state electronics.
- C. What are the primary troubleshooting steps used when trying to solve a problem?

VII. EVALUATION:

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

- 1. Written tests
- 2. Final exam

Typical Questions:

- a. Why do we use capacitors to start single-phase motors?
- b. What is current?

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 Refrigeration and Air Conditioning Electricity, Refrigeration Service Engineers Society, Des Plaines, IL, 2002

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None