

I. CATALOG DESCRIPTION:

A. Department Information:

Division: Refrigeration and Air Conditioning
Department: Refrigeration and Air Conditioning
Course ID: REFRIG 068A-Z
Course Title: Controls 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 refrigeration electronic controls. 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. Diagram basic control theory.
- B. Consider the fundamentals of electronics: resistance, inductance, and capacitance.
- C. Recognize electronic controlled systems.
- D. Inspect semiconductor applications.
- E. Examine the electronic principles used on control installations.
- F. Describe electronic troubleshooting techniques.
- G. Evaluate control system maintenance.

IV. CONTENT:

- A. Controls
 1. Basic control theory
 2. Fundamentals of Electronics
 1. Resistance, inductance, capacitance
 2. Principles of electronic control devices
 3. Principles of electronic devices
 4. Rectification and power supplies for electronic equipment
- C. AC Power and Grounding Practice
- D. Solid State Components
 1. Transistors and SCR's
 2. Diacs, triacs
 3. Solid state relays
- E. Operational Amplifiers
- F. The Wheatstone Bridge
- G. Basic Electronic Troubleshooting
- H. Installation
 1. Testing
 2. Troubleshooting
- I. Safety
- J. Controls
 1. Control valves
 2. Control dampers
 3. Electronic control applications
- K. Basic Electronic Device Information
 1. Parts 1 - 7

V. METHODS OF INSTRUCTION:

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

- A. Lectures and discussions about basic control theory, electronic fundamentals, solid-state components, control valves, dampers and maintenance.
- B. Lectures and discussions are complemented with handouts, show and tell demonstrations and instruction on system equipment and procedures.
- C. Dynamics are accented with the use of pictures 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. Write a paragraph using the following terms: cut-in point, cut-out point, differential, and control contacts.
- B. Describe the procedure for testing a thermostat.
- C. What two methods are used to obtain a snap action movement of the control contacts?

VII. EVALUATION:

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

- 1. Written tests
- 2. Final exam

Typical Questions:

- a. What is a diode, and what does it do?
- b. Explain basic control theory.

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 Controls, Refrigeration Service Engineers Society, Des Plaines, IL, 2002

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: None