

I. CATALOG DESCRIPTION:

- A. Department Information:
Division: Technology
Department: Refrigeration and Air Conditioning
Course ID: REFRIG 102x3
Course Title: Refrigeration II
Units: 4
Lecture: 3 Hours
Lab: 3 Hours
Prerequisite: REFRIG 101x3

B. Course and Schedule Description: Principles of refrigeration compression systems, operations and controls, refrigeration and freezer construction, piping and parts layout. Included in the lab work is troubleshooting and servicing domestic refrigeration units.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: Three (3)

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon completion of the first repetition of the course, students will be able to:

- A. Compare domestic refrigerator and freezer units.
- B. Interpret the theory and principles of compression systems.
- C. Categorize different domestic refrigeration cabinets, know their differences, and why.
- D. Evaluate freezer operation, ice-maker operation, and defroster systems.
- E. Distinguish between domestic and commercial refrigeration.
- F. Practice servicing domestic refrigeration units.
- G. Construct a domestic refrigerator or freezer.

Upon completion of the second repetition of the course, students will be able to:

- A. Illustrate skill and knowledge by categorizing domestic units by temperature range and cabinet style.
- B. Demonstrate servicing all domestic type units.
- C. Organize and evaluate the construction of lab projects.
- D. Develop confidence and skills while helping first-time students.

Upon completion of the third repetition of the course, students will be able to:

- A. Explain the operation of different domestic units by temperature range and cabinet style.
- B. Critique and advise students concerning their laboratory projects.
- C. Use their improved skill and knowledge to help first-time students and assisting the instructor.

IV. CONTENT:

- A. Domestic Refrigeration
 - 1. Domestic refrigeration equipment
 - 2. Domestic air conditioning systems
- B. Electric Circuits and Controls
 - 1. Electrical control systems
 - 2. Electric control module
- C. Evaporators and Condensers
 - 1. Evaporator construction
 - 2. Condenser construction
- D. Defrost
 - 1. Defrost systems
 - 2. Defrost components
- E. Compressors
 - 1. Types of compressors

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- 2. Compressor construction
- 3. Check valves
- F. Metering Devices
- G. Environmental Protection Agency:
 - 1. Universal, 604 certification for domestic equipment
- H. Cabinet Construction
- I. Insulation Properties

V. METHODS OF INSTRUCTION:

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

- A. Lectures and discussions about domestic refrigerators, freezers, their compression systems, cabinet types, refrigeration peripherals and servicing.
- B. Lectures and discussions are complemented with practical laboratory projects emphasizing system properties, methods of analysis and troubleshooting.
- C. Dynamics are accented with the use of show and tell demonstrations 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. Calculate the enthalpy of water at a variety of temperatures.
- B. Draw a pictorial configuration for a top freezer refrigerator.
- C. Construct a bread board version of a domestic refrigerator.
- D. Assemble a project portfolio including: pictorial diagrams, assembly procedures, pictures, and a project term paper (graded on content and spelling).

VII. EVALUATION:

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

- 1. Written tests
- 2. Final exam
Typical Questions:
 - a. Explain the principles of heat transfer.
 - b. List the various types of tubing used in refrigeration work.
- 3. Project assembly, to include one project portfolio per student, consisting of:
 - a. A typed paper discussing theory and design.
 - b. Proof of project assembly. (picture)
 - c. A presentation to the instructor including: temperature objective, problems confronted, and any deviation from the original design.

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

- 1. Three written tests
- 2. One final exam.

C. Levels of evaluation upon repetition:

- 1. First enrollment:
Students are expected to have a good understanding of domestic refrigeration systems.
- 2. Second enrollment:
Students are expected to have a thorough understanding of domestic refrigeration and an observable growth in confidence and working skills to assist the instructor in the laboratory.
- 3. Third enrollment:
Students are expected to show increasing skills while working as group leaders and assisting the instructor in lecture demonstrations and organizing and evaluating lab projects.

VIII. TYPICAL TEXT:

Althouse, Modern Refrigeration and Air Conditioning, Goodheart/Willcox, Tinley Park, IL, 2000

Althouse, Modern Refrigeration and Air Conditioning Study Guide, Goodheart/Willcox, Tinley Park, IL, 2000

Dossat, R., Principles of Refrigeration, Prentice Hall, NJ, 2002

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IX. **OTHER SUPPLIES REQUIRED OF STUDENTS:** None