

MERCER COUNTY COMMUNITY COLLEGE
Business & STEM

Course Outline

HRA-102
Course Number

Principles of Refrigeration and Air Conditioning II
Course Title

Credits-2

Class Hours – 1

Laboratory Hours – 2

TEXT:

Refrigeration & Air Conditioning Technology

Authors: Whitman, Johnson, Tomczyk

ISBN: 076680667-7

Publisher: Thomson Learning

Length of Semester – 15 Weeks

Catalog Description:

Fundamental principles of basic refrigeration and air conditioning systems, compressors, condensers, evaporations and metering devices.

Prerequisite- HRA-101

Co-requisite — None

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Latest Review: Spring 2019

Course Objectives:

This course is intended to provide the student with a general knowledge of vapor compression, refrigeration and air conditioning systems. Particular attention will be given to types of compressors, condensers, metering devices and evaporators. Laboratory sessions will include compressors disassembly and parts identification, recovery, evacuation and charging systems. System troubleshooting techniques and component replacement will be emphasized throughout.

UNIT I (6 nights)-Compressors, Condensers, Liquid Receivers and Evaporators

Specific Objectives:

The student will be able to...

1. Identify and explain differences between reciprocating, rotary, screw and scroll compressors and be familiar with the operation of each type.
2. Disassemble, identify parts and reassemble open and semi-hermetic compressors,
3. Identify various types of evaporators, condensers and liquid receivers.

Instructional Content and Methods:

1. Basic concepts of each type compressor, condenser and evaporator will be covered during lecture hours with the aid of slides and videos.
2. Laboratory compressors will be disassembled and reassembled by the students.
3. Students will instrumentize various types of refrigeration systems and practice basic troubleshooting techniques.

Evaluation:

At least one written and one laboratory evaluation will be given covering this material.

UNIT II (4 nights)- Metering Devices

Specific Objectives:

The students will be able to...

1. Install, identify and be familiar with the function of the capillary tube, automatic expansion valve and thermostatic expansion valve.
2. Recognize and explain the limitation of metering devices listed in item 1 above.
3. Disassemble and identify parts in the thermostatic expansion valve.
4. By use of laboratory equipment, see the operating characteristics of each type of metering device. Perform superheat adjustments to expansion valve operation.

Instructional Content and Methods:

1. Lecture periods will be used with the aid of slides and overheads projections to explain the theory of operation of the capillary tube, thermostatic expansion valves while showing the limitations of each.
2. Laboratory equipment will be used to observe operating characteristics and application of each metering device listed in item 1 above.

Evaluation:

At least one written and one laboratory evaluation will be given covering this material.

UNIT III (5 nights)- Recovery, Evaluation and Charging

Specific Objectives:

The student will be able to...

1. Identify and explain basic concepts of refrigeration system recovery, evaluation and charging procedures.
2. Explain the operation of a refrigeration recovery system and identify its components.
3. Explain the operation of a vacuum pump and charging cylinder.

Instructional Content and Methods:

1. Basic concepts and operation of each device will be covered during lecture hours with the aid of slides and videos.
2. Students will be given classroom exercises involving the diagramming of recovery system installation and operation.
3. Laboratory equipment will be used for "hands-on., training of system recovery, evaluation and charging procedures.

Evaluation:

At least one written examination will be administered covering this

material. COURSE EVALUATION AND GRADING

While the exact procedure for grading will be up to the individual instructor, the following guidelines will apply:

1. A written final examination covering all material presented in the course before he/she can successfully complete the course.
2. Final grade will be determined by evaluating final exam results, test results (a minimum of two tests, other than the final examination, will be given), quiz grades, laboratory performance and attendance.
3. Extra credit work will generally not be considered recognized in evaluating student performance, however, individual instructors do have limited flexibility in maneuverability in recognizing additional effort and performance by an individual student.