



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number	Course Title	Credits
HRA 202	Light Commercial Systems I	2
Hours: Lecture/Lab/Other	Pre-requisite	Implementation Semester & Year
1 Lecture/2 Lab	HRA 102, HRA 103	Spring 2022

Catalog description:

Explores electrical and mechanical component configurations, including wiring and controls, for light commercial systems.

General Education Category:

Not GenEd

Course coordinator:

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Required texts & Other materials:

Refrigeration & Air Conditioning Technology by Whitman, Johnson, Tomczyk, 5th Edition, Thompson Learning ISBN: 1-4018-3765-4.

Course Student Learning Outcomes (SLO):

Upon successful completion of this course the student will be able to install, start up and maintain small commercial refrigeration systems, including being able to:

1. Select the proper location for condensing unit and fixture. [ILG # 3, 10, 11; PLO # 2, 4, 8]
2. Install the fixture condensate drain. [ILG # 3, 10, 11; PLO # 2, 8]
3. Field wire the condensing unit and fixture. [ILG # 3, 10, 11; PLO # 2, 4, 7, 8]
4. Select and install all necessary tubing. [ILG # 3, 10, 11; PLO # 8]
5. Leak check, evacuate and charge the system. [ILG # 3, 4, 10, 11; PLO # 2, 3]
6. Start-up the unit and set system controls as required. [ILG # 3, 4, 10, 11; PLO # 2, 3, 4]
7. Employ recovery equipment as needed for repairs. [ILG # 3, 4, 10, 11; PLO # 2, 3]

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for Heating, Refrigeration and Air Conditioning (PLO)

2. Service, troubleshoot, and repair domestic and commercial refrigeration and air conditioning systems and components.
3. Use electrical and mechanical test equipment and metering devices.
4. Utilize a working knowledge of control circuitry, instrumentation and ladder diagram/schematic interpretation.
7. Produce basic mechanical drawings and sketches needed to communicate concepts and designs.
8. Understand the laws of physics as they apply to the subject field.

Units of study in detail – Unit Student Learning Outcomes:

Unit I **Locate Unit and Piping [Supports Course SLO # 1, 2, 3, 4]**

Learning Objectives

The student will be able to:

1. Set the refrigeration fixture in accordance with the manufacturer's specifications and connect condensate drain.
2. Locate the refrigeration condensing unit and perform electrical check of unit and fixture.
3. Select from industry data liquid and suction line sizes.
4. Evaluate from manufacturer's data compressor capacity and fixture requirements.
5. Install, insulate, leak check and evaluate entire system.

Unit II **System Wiring [Supports Course SLOs # 3, 5, 7]**

Learning Objectives

The student will be able to:

1. Explain the function of all electrical components in the system.
2. Duplicate from memory the wiring diagram for the system being installed.
3. Troubleshoot malfunctions in all system components.
4. Completely field wire a small commercial refrigeration system, including selecting the correct wire size.

Unit III **Starting, Charging and Setting System Controls [Supports Course SLOs # 5, 6, 7]**

Learning Objectives

The student will be able to:

1. Properly charge a small refrigeration system.
2. Set all pressure switches, thermostats, defrost timer and refrigeration devices properly.
3. Test total system for normal operation in refrigeration and defrost modes.
4. Utilize recovery equipment to facilitate needed repairs.

Evaluation of student learning: [Evaluates SLOs # 1 - 7]

Students' achievement of the course objectives will be evaluated through the use of the following:

- Results of a comprehensive final exam.
- Test results (a minimum of two tests, other than the final examination).
- Laboratory Performance
- Attendance.

Evaluation Tools	Percentage Of Grade
Tests and Exam	33.3%
Laboratory Performance	33.3%
Attendance	33.3%
Total	100%