

**NORTHEAST COMMUNITY COLLEGE  
COURSE SYLLABUS**

**HVAC 2120  
COMMERCIAL REFRIGERATION LAB**

**SPRING 2015**

# **NORTHEAST COMMUNITY COLLEGE COMMERCIAL REFRIGERATION LAB COURSE SYLLABUS**

## **I. CATALOG DESCRIPTION:**

**COURSE NUMBER:** HVAC 2120

**COURSE TITLE:** Commercial Refrigeration Lab

**PRE-REQUISITES:** HVAC 1120

**CO-REQUISITES:** HVAC 2110

**DESCRIPTION:** Refrigeration lab applied to commercial fields, including compressors, condensers, receivers, evaporators, and applications using refrigerant controls, water valves, refrigerant oils, and special equipment.  
(30/105/0/0)

### **CREDIT/CONTACT HOUR DESIGNATION:**

Credits: 4   Lecture: 30   Lab: 105   Clinical: 0   Coop: 0

**TERM:** Spring 2015

## **II. COURSE OBJECTIVES:**

Course will:

1. Explore commercial refrigeration theory.
2. Introduce the characteristics of refrigerants, temperature and pressure, tools and equipment, and maintenance associated with commercial refrigeration equipment.
3. Familiarize students with the installation and start-up, preventative maintenance, and light service of light commercial refrigeration equipment.
4. Discuss refrigerants applications.

## **III. STUDENT LEARNING OUTCOMES:**

The student will be able to:

1. Take pressure and temperature readings and determine superheat of the refrigerant in the evaporator operating under normal and loaded conditions.\*
2. Evaluate the performance of a direct expansion evaporator.
3. Check the evaporator while it is under excessive load and observe the changing conditions while the load is being reduced.
4. Determine condensing temperatures from the pressure-temperature chart using the compressor discharge pressure, and determine the condensing superheat under normal loaded conditions.\*

5. Perform basic evaluation procedures on an air-cooled condenser.
6. Evaluate a simple water-cooled refrigeration system.
7. Evaluate a suction gas-cooled compressor for the correct operating temperatures while it is operating.
8. Evaluate performance of a hermetic compressor.
9. Disassemble a hermetic compressor and identify components.
10. Describe the characteristics of a thermostatic expansion valve and adjust it for more or less superheat.
11. Evaluate a refrigeration system and make a repair on a no-cooling problem.
12. Evaluate a system for correct mechanical operation.
13. Change a thermostatic expansion valve with a minimum loss of refrigerant.

\*These course objectives are directed toward meeting the Fundamental Academic Competencies and Skills (FACS).

#### **IV. CONTENT/TOPICAL OUTLINE:**

##### **A. Commercial Refrigeration Textbook**

1. Chapter 1: Refrigeration Principles
2. Chapter 2: Evaporators
3. Chapter 3: Condensers
4. Chapter 4: Compressors
5. Chapter 5: Metering Devices
6. Chapter 6: Controls and Accessories
7. Chapter 7: Refrigeration System Troubleshooting

##### **B. Refrigeration and Air Conditioning Technology Textbook**

1. Unit 21
2. Unit 22
3. Unit 23
4. Unit 24

Note: Each unit will include additional handouts and general training slide presentations. Additional wiring for commercial refrigeration systems will also be included.

#### **V. INSTRUCTIONAL MATERIALS:**

##### **A. Required Text:**

1. Commercial Refrigeration for Air Conditioning Technicians; 2nd Ed.  
Editor: Dick Wirz
2. Refrigeration & Air Conditioning Technology Lab Manual; 6<sup>th</sup> Ed.  
Authors: Whitman

##### **B. Required Materials**

1. Notebook
2. Pens/Pencil
3. Calculator
4. Pressure/Temperature Chart

5. Safety Glasses

**VI. METHOD OF PRESENTATION:**

A. Methods of presentation typically include a combination of the following:

1. Assigned lab projects
2. Multimedia presentations
3. Independent study
4. Formal and informal lectures
5. Demonstrations
6. Group projects
7. Practical applications
8. Individuals lab competencies

**VII. METHOD OF EVALUATION:**

A. Methods of evaluation typically include a combination of the following:

1. Ability to follow lab procedures
2. Safety
3. Demonstration of competencies

B. Grading Scale:

95 - 100	A+
90 - 94	A
85 - 89	B+
80 - 84	B
75 - 79	C+
70 - 74	C
65 - 69	D+
60 - 64	D
Below 60	F

**VIII. COURSE REQUIREMENTS:**

A. Attendance

1. Students are expected to attend class. Missed quizzes/assignments cannot be made up unless approved by the instructor. If you cannot attend class, see or call instructor (phone number 402-844-7230). Your grade will start dropping by a letter grade for each day after three days.

B. Student Conduct

1. Students will also be expected to conform to the Student Code of Conduct.

**IX. SUPPORT SERVICES:**

A. Library Service:

The Northeast Community College Library Resource Center provides students with tools to conduct scholarly research and increase knowledge. Through the library's subscription databases, students have access to millions of current and credible resources not available through Google, Yahoo, and other search engines. Links to online databases and the library's online catalog can be found at <http://www.northeast.edu/Library-Resources/>. Students who would like assistance in utilizing the library's resources are encouraged to contact the library for further information and personal service at 402-844-7131 or email [marylouise@northeast.edu](mailto:marylouise@northeast.edu).

**B. Disabilities:**

Students with a documented disability may be eligible for certain accommodations that support their success in the classroom. Please contact Mary Balaski, Disability Services Coordinator, for further information. Her office is located in CWC- 1263; also, she may be reached at 402-844-7343 or [mary@northeast.edu](mailto:mary@northeast.edu).

**C. Applied Technology Division Safety Statement**

Through the course of the semester you will be working with and around equipment that can be dangerous. The inherent dangers include both kinetic and potential energy; examples include, but are not limited to, high voltages, rotating equipment, high pressure hydraulics, compressed air, items that are heavy and/or hot, and the risk of fall or shock. Every effort has been made to minimize these risks and you will receive instruction and training as a part of this course (and related courses) in the proper safety procedures and equipment operation protocols. If you have a health condition or physical limitation that may affect you or another student's safety, you are to consult with the instructor prior to beginning to work with the equipment or undertaking a task involving the equipment. It is the student's responsibility to be able to follow all safety procedures and equipment operation protocols. Failure to abide by safety practices, procedures, or equipment protocols could result in serious injury or death. Failure to follow these safety practices / procedures or equipment protocols will not be tolerated and the student could face student disciplinary action including reduction of grade and possible removal from the course. Removal from the course could also result in loss of credit for the course and affect a student's financial aid.

**X. INSTRUCTOR NAME AND CONTACT INFORMATION:**

**Instructor:** Mr. Paul Bailey

**Office:** Weller 128

**Office Phone:** 402-844-7230

**Home Phone:** 402-371-0394 (after 5:00pm)

**Email:** [paulb@northeast.edu](mailto:paulb@northeast.edu)

**Office Hours:** Monday – Thursday 7:00am – 7:15am, 11:15am – 12:30pm



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