# NORTHEAST COMMUNITY COLLEGE
# COURSE SYLLABUS

# HVAC 2320
# COMMERCIAL AIR CONDITIONING AND REFRIGERATION LAB

# SPRING 2015

# NORTHEAST COMMUNITY COLLEGE
# COMMERCIAL AIR CONDITIONTING AND REFRIGERATION LAB
# COURSE SYLLABUS

## I. CATALOG DESCRIPTION:

**COURSE NUMBER:** HVAC 2320

**COURSE TITLE:** Commercial Air Conditioning and Refrigeration Lab

**PRE-REQUISITES:** HVAC 2220

**CO-REQUISITES:** HVAC 2310

**DESCRIPTION:** Practical application of the construction, installation, and service for commercial refrigeration and air conditioning coolers, ice machines, and piping layouts. (22.5/112.5/0/0)

**CREDIT/CONTACT HOUR DESIGNATION:**

Credits: 4 Lecture: 22.5 Lab: 112.5 Clinical: 0 Coop: 0

**TERM**: Spring 2015

## II. COURSE OBJECTIVES:

Course will:

1. Explore commercial refrigeration theory.
2. Introduce the math needed to determine pipe sizing and other related calculations.
3. Build and understanding of refrigerant handling.
4. Demonstrate proper procedures in installing, designing, and troubleshooting commercial air conditioning and refrigeration systems.

## III. STUDENT LEARNING OUTCOMES:

The student will be able to:

1. Identify other refrigeration accessories used in commercial applications.
2. Pump the refrigerant into the receiver so that the low-pressure side of the system may be serviced.
3. Adjust a CPR valve in a typical refrigeration system.*
4. Determine the application and approximate temperature range of a refrigeration system by its features.*
5. Demonstrate wiring defrost timer for hot gas and electric.
6. Demonstrate wiring starting components and controls.

7. Follow the ice-making cycle of particular ice-making machine.
8. Successfully troubleshoot a service problem.*
9. Demonstrate proper piping practices for walk-in applications.

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

## IV. CONTENT/TOPICAL OUTLINE:

A. Commercial Refrigeration Textbook
   1. Chapter 6: Controls and Accessories
   2. Chapter 7: Refrigeration System Troubleshooting
   3. Chapter 8: Compressor Motor Controls
   4. Chapter 9: Retrofitting, Recovery, Evacuation, and Charging
   5. Chapter 10: Supermarket Refrigeration
   6. Chapter 11: Walk-in Refrigerators and Freezers
   7. Chapter 12: Ice Machines
   8. Chapter 13: Product Temperatures for Preservation and Health
   9. Chapter 14: Refrigeration Business Tips

B. Refrigeration Lab Book Components
   1. #89 – Checking the Temperature Rage of a Refrigerated Case or Walk-in
   2. #90-Setting Controls for an Automatic Pump-Down System
   3. #91-Adjusting and Checking Evaporator Pressure Control (EPR Valve)
   4. #92-Adjusting and Checking the Crankcase Pressure Regulators
   5. #93-Checking the Condition of Compressor Reed Valves
   6. #94-Check Compressor for High Backpressure Overloading
   7. #95-Checking the Operation of a Paragon 8145-20 Defrost Timer
   8. #96-Checking the Control Operation of a Defrost Termination Thermostat/Fan Delay Control.
   9. #97-Checking Solenoid Valve
   10. #98-Changing Oil in a Semi-hermetic Compressor
   11. #99-Retrofitting a Refrigeration System that has a Cap Tube Metering Device
   12. #100-Retrofitting a Refrigeration System that has a TEV Metering Device
   13. #101-Refrigeration Equipment Vapor Recovery Procedures
   14. #102-Refrigeration Equipment Liquid Recovery Procedures
   15. #103-Refrigeration Equipment Startup and System Charging Procedures
   16. #104-Procedures for Removing Gages from a Refrigeration System

## V. INSTRUCTIONAL MATERIALS:

A. Required Text**:**
   1. Commercial Refrigeration for Air Conditioning Technicians; 2nd Ed.
      Editor: Dick Wirz
      ISBN-10: 1-4283-3526-9

   2. Refrigeration, Residential and Light Commercial Text and Lab Book
      Author: Cecil Johnson

B. Required Materials

1. Notebook
2. Pens/Pencil
3. Calculator
4. Safety Glasses

## VI. METHOD OF PRESENTATION:

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

1. Handouts
2. Multimedia presentations
3. Independent study
4. Formal and informal lectures
5. Demonstrations

## VII. METHOD OF EVALUATION:

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

1. Class participation (attendance and engagement)
2. Tests/quizzes
3. Assignments

B. Grading Rubric:

| | |
|---|---|
| Tests | 60% |
| Quizzes/Assignments | 40% |

C. Grading Scale:

| | |
|---|---|
| 95 - 100 | A+ |
| 90 - 94 | A |
| 85 - 89 | B+ |
| 80 - 84 | B |
| 75 – 89 | 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.

### 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.

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

This product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.