

**NORTHEAST COMMUNITY COLLEGE  
COURSE SYLLABUS**

**HVAC 1110  
BASIC REFRIGERATION PRINCIPLES**

**FALL 2015**

# **NORTHEAST COMMUNITY COLLEGE BASIC REFRIGERATION PRINCIPLES COURSE SYLLABUS**

## **I. CATALOG DESCRIPTION:**

**COURSE NUMBER:** HVAC 1110

**COURSE TITLE:** Basic Refrigeration Principles

**PRE-REQUISITES:** None

**CO-REQUISITES:** None

**DESCRIPTION:** Laws of physics and principles of chemistry that apply to refrigeration and air conditioning. Also, a study of refrigerators and freezers.

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

Credits: 2.5   Lecture: 37.5   Lab: 0   Clinical: 0   Coop: 0

**TERM:** Fall 2015

## **II. COURSE OBJECTIVES:**

Course will:

1. Use various refrigeration and air conditioning tools.
2. Explain principles of heat transfer.
3. Identify general safety rules.
4. Explain compressor performance.
5. Explain compressor lubrication.
6. Identify basic compressor fundamentals.
7. Explain the compression refrigeration cycle.
8. Explain the principle refrigerant controls.
9. Identify work and awareness of acceptable work practices, attitudes, and personality traits.\*
10. Identify refrigerants and proper usage.

\*Course objectives are directed toward enhancing the Fundamental Academic Competencies and Skills (FACS) in written communication, problem solving, social skills, and critical thinking.

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

The student will be able to:

1. Identify the major components of a refrigeration system.

2. Describe the basic refrigeration cycle.
3. Explain the basics of thermodynamics, heat transfer, and temperature and pressure relationships.
4. Apply safety principles in working with an around refrigerants.
5. Properly select and use tools and equipment related to refrigeration systems.
6. Discuss refrigerant containment and control.

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

##### **A. Section 1: Theory of Heat**

1. Unit 1: Theory
2. Unit 2: Matter and Energy
3. Unit 3: Refrigeration and Refrigerants

##### **B. Section 2: Safety, Tools, and Equipment, Shop Practice**

1. Unit 4: Theory
2. Unit 5: Tools and Equipment
3. Unit 6: Fasteners
4. Unit 7: Tubing and Piping
5. Unit 8: System Evacuation
6. Unit 9: Refrigerant Management-Recovery/Recycling/Reclaiming
7. Unit 10: System Charging
8. Unit 11: Calibrating Instruments

##### **C. Section 9: Domestic Appliances (Optional)**

1. Unit 44: Domestic Refrigerators
2. Unit 45: Domestic Freezers

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

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

1. Refrigeration and Air Conditioning Technology, 7<sup>th</sup> Ed.  
Authors: Whitman, Johnson, Tomczyk, Silberstein.

##### **B. Required Workbook:**

1. Refrigeration and Air Conditioning Technology-Lab Manual
2. Practical Competencies Lab Manual

##### **C. Required Materials:**

1. Blue/Black pen
2. Pencils
3. Notebook
4. Calculator
5. Colored pencils
6. Straight edge

## **VI. METHOD OF PRESENTATION:**

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

1. Informal lectures (casual communication of knowledge).
2. Handouts of selected printed material covered in class.
3. Audiovisual aids (transparencies and videos)
4. Independent study (reading of handouts, text, and preparing for test).
5. Group projects.

B. Instructor Absence:

1. If instructor is absent, see other instructor for details (Paul). Listen to radio for weather related school announcements.

## **VII. METHOD OF EVALUATION:**

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

1. Completed assignments
2. Quizzes
3. Tests

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
0 - 59	F

## **VIII. COURSE REQUIREMENTS:**

A. Attendance

1. Students are expected to attend class. Quizzes will be given and cannot be made up unless approval from instructor. If you cannot attend class, see or call instructor (phone number 402-844-7231). Your grade will start dropping by a letter grade for each day after three days.

B. Student Conduct

1. Students are expected to complete your own work. Students will also be expected to conform to the Student Code of Conduct that was handed out.

C. Lab Attendance and Conduct

1. Lab time is for completing lab assignments. Students are expected to attend all labs and work on assignments during lab time. Playing games and not attending the full lab time are inappropriate.

**D. Assignment Completion**

1. All assignments are to be completed by the assigned date. Late assignments will only be accepted with approval from the instructor. Late assignments will not be accepted if more than one week.

**IX. SUPPORT SERVICES:**

**A. 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).

**B. Service Center:**

Students may get assistance with computer-related problems through the College's Service Center; [help@northeast.edu](mailto:help@northeast.edu). It is strongly advised that a student participate in on-line training via a formal course or the on-line tutorials available through Northeast Community College's homepage; <http://northeast.edu/help/>

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

**Phone number:** 402-844-HELP (4357)

**In person:** The Service Center is located in the Library on the Norfolk campus

**Service Center Hours of Operation:**

Sunday 1:00 p.m. - 9:00 p.m.

Monday - Thursday 7:00 a.m. to 10:00 p.m.

Friday 7:00 a.m. to 5:00 p.m.

*If you have technical questions regarding the My Classes Online environment you need to contact the Service Center. Questions regarding the course content need to be directed to the instructor via My Classes Online Course Mail (email).*

**C. Advising & Academic Support Center (CWC 1284)**

This is a one stop shop for all students. Advisors are available to assist with schedules, career planning, transfer questions, change of majors, academic recovery and other issues impacting academic success. Located in CWC 1284, students will find a study space, lounge area and computers. Direct contact information is as follows:

Amanda Engelhart – 402.844.7125 or [amandae@northeast.edu](mailto:amandae@northeast.edu)

1. Tutoring – CWC 1284

2. Writer's Clinic – CWC 1284

**D. 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).

**E. Title IX:**

While I want you to feel comfortable coming to me with issues you may be struggling with or concerns you may be having, please be aware that I have reporting requirements that are part of my job requirements at Northeast Community College.

For example, if you inform me of an issue of sexual harassment, sexual assault, or discrimination I will keep the information as private as I can, but I am required to bring it to the attention of the institution's Title IX Coordinator. The Associate Vice President of Human Resources is the Title IX Coordinator and can be reached by calling 402-844-7046. You could also call the Vice President of Student Services at 402-844-7273. Additionally, you can report incidents or complaints to the Dean of Student Life by calling 402-844-7722.

Another common example is if you are struggling with an issue that may be traumatic or unusually stress producing, I will likely inform the Northeast Counseling Services office. If you would like to reach out directly to the Counseling Office, the contact number is 402-844-7277.

Finally, know that if, for some reason, our interaction involves a disruptive behavior or potential violation of policy, I will inform the Director of Student Conduct office even when you and I may have reached a resolution to the incident. The purpose of this is to keep the Director apprised of any concerning behaviors and what was done to resolve them.

**F. 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:** John Nelson

**Office:** APT 144

**Phone:** 402-844-7231

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

**Office Hours:** Posted



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