

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: HVAC 202

Course Title: Advanced HVAC I

Division:  Applied Science (AS)  Liberal Arts (LA)  Workforce Development (WD)  
 Health Care (HC)  Lifetime Learning (LL)  Nursing  Developmental

Credit Hour(s): 5

Effective Date: Fall 2014

Assessment Goal Per Outcome: 80%

**COURSE DESCRIPTION**

This course explains the factors that affect the heating and cooling loads of a building. It describes the process by which the heating and cooling loads are calculated; explains air properties, related gas laws, and psychrometric principles and charts; and introduces the trainee to various heat recovery/reclaim devices and energy reduction apparatuses. It explains how to analyze circuit diagrams for electronic and microprocessor-based controls and covers the operation, testing, and adjustment of conventional and electronic thermostats, as well as the operation of common electrical, electronic, and pneumatic circuits used to control HVAC systems. It describes the purpose of planned maintenance and outlines the procedures for servicing HVAC equipment.

**MINIMUM REQUIREMENTS/PREREQUISITES AND/OR COREQUISITES**

HVAC 122-HVAC Fundamentals and HVAC 124-HVAC Lab

**TEXTS**

The official list of textbooks and materials for this course is found on myNeosho.

<http://www.neosho.edu/ProspectiveStudents/Registration/CourseSyllabi.aspx>

## **GENERAL EDUCATION OUTCOMES**

1. Practice Responsible Citizenship through:
  - identifying rights and responsibilities of citizenship,
  - identifying how human values and perceptions affect and are affected by social diversity,
  - identifying and interpreting artistic expression.
2. Live a healthy lifestyle (physical, intellectual, social) through:
  - listing factors associated with a healthy lifestyle and lifetime fitness,
  - identifying the importance of lifetime learning,
  - demonstrating self-discipline, respect for others, and the ability to work collaboratively as a team.
3. Communicate effectively through:
  - developing effective written communication skills,
  - developing effective oral communication and listening skills.
4. Think analytically through:
  - utilizing quantitative information in problem solving,
  - utilizing the principles of systematic inquiry,
  - utilizing various information resources including technology for research and data collection.

## **COURSE OUTCOMES/COMPETENCIES**

Students will be able to:

### **OUTCOME 1: Explain the history and terminology associated with the HVAC industry.**

#### **Competencies:**

1. Explain the history of the HVAC/R industry, including today's job opportunities and trade associations.
2. Explain the fundamental scientific principles of the mechanical refrigeration cycle and system components using standard HVAC/R terminology.

### **OUTCOME 2: Demonstrate an understanding of the safety, measurements, and metering devices utilized in the HVAC industry.**

#### **Competencies:**

1. Discuss safety issues related to the HVAC/R industry.
2. Demonstrate how to measure various parameters of an HVAC system.
3. Discuss the concepts of temperature and pressure measurements.
4. Describe and identify the different metering devices used in A/C systems and their applications.

**OUTCOME 3: Demonstrate an understanding of air quality, refrigeration piping and tubing, compressors, and installation of a central air conditioning system for proper performance.**

**Competencies:**

1. Explain the importance of air flow and air quality as it relates to HVAC systems.
2. Describe the characteristics of refrigeration piping and tubing and how they are used.
3. Identify various types of compressors used in the HVAC industry and discuss their applications.
4. Explain how to properly install and adjust a central air conditioning system for proper performance.
5. Demonstrate troubleshooting techniques required to locate air conditioning system problems.

**OUTCOME 4: Demonstrate an understanding of heat pump system functions.**

**Competencies:**

1. Explain how a heat pump system functions.
2. List and explain the function of a heat pump system's components.
3. Compare and contrast air and water source heat pump system applications.
4. Demonstrate troubleshooting techniques required to locate heat pump system problems.

**OUTCOME 5: Demonstrate an understanding of major residential construction components and indoor air quality products.**

**Competencies:**

1. Identify the major residential construction components.
2. Identify and explain the different indoor air quality products and how they are used in HVAC.

**MINIMUM COURSE CONTENT**

The following topics must be included in this course. Additional topics may also be included.

1. Refrigeration Cycle
2. Air Flow Principles
3. Methods for Installing HVAC systems
4. Examination of the 4 Major Refrigeration Components
5. Troubleshooting Cooling Systems and Controls
6. Maintenance of Refrigeration Systems
7. Indoor Air Quality
8. Heat Pumps

**NCCER MODULES COVERED IN COURSE**

- 03109-07 Air Distribution Systems
- 03201-07 Commercial Airside Systems
- 03204-07 Air Quality Equipment
- 03302-08 Compressors
- 03303-08 Metering Devices
- 03210-07 Troubleshooting Cooling
- 03211-07 Heat Pumps

## **STUDENT REQUIREMENTS AND METHOD OF EVALUATION**

Evaluation of student performance is determined primarily from results of written and performance tests to validate mastery of course competencies. Due to the nature of the class, student participation, teamwork, courtesy, honesty, and adherence to safety policies are required.

### **GRADING SCALE**

Grades will be assigned based on the number of points earned by the student.

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	<60%

## **ASSESSMENT OF STUDENT GAIN**

Students will be assessed through written testing. Practical application will be assessed on the first attempt at the skill and again at the conclusion of the course. Comparison will determine the extent of student gain.

### **Attendance Policy**

1. NCCC values interactive learning which promotes student engagement in the learning process. To be actively engaged, the student must be present in the learning environment.
2. Unless students are participating in a school activity or are excused by the instructor, they are expected to attend class. If a student's absences exceed one-eighth of the total course duration, (which equates to one hundred (100) minutes per credit hour in a face-to-face class) the instructor has the right, but is not required, to withdraw a student from the course. Once the student has been dropped for excessive absences, the registrar's office will send a letter to the student, stating that he or she has been dropped. A student may petition the chief academic officer for reinstatement by

submitting a letter stating valid reasons for the absences within one week of the registrar's notification. If the student is reinstated into the class, the instructor and the registrar will be notified. Please refer to the Student Handbook/Academic Policies for more information

3. Absences that occur due to students participating in official college activities are excused except in those cases where outside bodies, such as the State Board of Nursing, have requirements for minimum class minutes for each student. Students who are excused will be given reasonable opportunity to make up any missed work or receive substitute assignments from the instructor and should not be penalized for the absence. Proper procedure should be followed in notifying faculty in advance of the student's planned participation in the event. Ultimately it is the student's responsibility to notify the instructor in advance of the planned absence.

### **ACADEMIC INTEGRITY**

NCCC expects every student to demonstrate ethical behavior with regard to academic pursuits. Academic integrity in coursework is a specific requirement. Definitions, examples, and possible consequences for violations of Academic Integrity, as well as the appeals process, can be found in the College Catalog, Student Handbook, and/or Code of Student Conduct and Discipline.

### **ELECTRONIC DEVICE POLICY**

Student cell phones and other personal electronic devices not being used for class activities must not be accessed during class times unless the instructor chooses to waive this policy.

### **NOTE**

Information and statements in this document are subject to change at the discretion of NCCC. Students will be notified of changes and where to find the most current approved documents.

### **ACCOMMODATIONS**

If you are a student with a disability who may need accommodation(s), in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990, please notify the Dean of Student Services in the Student Services Office, Sanders Hall, 620-432-0304, on the Chanute Campus, or the Dean for the Ottawa and Online Campuses, 785-248-2798, on the Ottawa Campus as soon as possible. You will need to bring your documentation for review in order to determine reasonable accommodations, and then we can assist you in arranging any necessary accommodations.

### **NON-DISCRIMINATION POLICY**

The following link provides information related to the non-discrimination policy of NCCC, including persons with disabilities. Students are urged to review this policy.

<http://www.neosho.edu/Departments/NonDiscrimination.aspx>

### **SEXUAL MISCONDUCT POLICY (TITLE IX)**

At NCCC, it is the responsibility of an instructor to help create a safe learning environment in the classroom, including both physical and virtual classrooms. All instructors are considered mandatory reporters at NCCC, therefore any information regarding sexual misconduct that is shared by a student in one-on-one meetings with the instructor must be reported to appropriate personnel at the College. Instructors will keep the information private to the greatest extent possible, but it is not confidential. Generally, climate surveys, classroom writing assignments or discussions, human subjects research, or events such as Take Back the Night events do not provide notice that must be reported to the Coordinator by employees, unless the reporting party clearly indicates that they wish a report to be made.

The following link provides information related to the sexual misconduct policy of NCCC, including resources, reporting options, and student rights. Students are urged to review this policy.

<http://www.neosho.edu/TitleIX.aspx>

### **COURSE NOTES**