

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: CMCT 211

Course Title: Electrical, HVAC, Drain, Waste & Vent

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

Credit Hour(s): Four (4)

Effective Date: Fall 2017

Assessment Goal Per Outcome: 70%

**COURSE DESCRIPTION**

This course covers the basic principles of heat transfer, refrigeration, and pressure-temperature relationships and describes the components and accessories used in air condition systems, and air conditioning, career opportunities in HVAC. It also covers heating fundamentals, types and designs of furnaces and their components, and basic procedures for installing and servicing furnaces.

This course teaches you about power generation and distribution, electrical components, DC circuits, and electrical safety. It also covers the selection, preparation, joining, and support of copper and plastic piping and fittings.

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

None

**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 (as Required)

1. Demonstrate electrical safety. MODULE 68112-09 – ELECTRICAL SAFETY
  - a. Recognize safe working practices in the construction environment.
  - b. Explain the purpose of OSHA and how it promotes safety on the job.
  - c. Identify electrical hazards and how to avoid or minimize them in the workplace.
  - d. Explain safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.
  - e. Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.
2. Demonstrate knowledge of residential wiring. MODULE 68113-09 – RESIDENTIAL ELECTRICAL SERVICES
  - a. Explain the role of the National Electrical Code® in residential wiring
  - b. Describe how to determine electric service requirements for dwellings.
  - c. Explain the grounding requirements of a residential electric service.
  - d. Calculate and select service-entrance equipment.
  - e. Select the proper wiring methods for various types of residences.
  - f. Compute branch circuit loads and explain their installation requirements.
  - g. Explain the types and purposes of equipment grounding conductors.
  - h. Explain the purpose of ground fault circuit interrupters and tell where they must be installed.
  - i. Size outlet boxes and select the proper type for different wiring methods.
  - j. Describe rules for installing electric space heating and HVAC equipment.
  - k. Describe the installation rules for electrical systems around swimming pools, spas, & hot tubs.
  - l. Explain how wiring devices are selected and installed.
  - m. Describe the installation and control of lighting fixtures.

3. Demonstrate knowledge of HVAC systems. MODULE 68114-09 – INTRODUCTION TO HVAC
  - a. Explain the basic principles of heating, ventilating, and air conditioning.
  - b. Identify career opportunities available to people in the HVAC trade.
  - c. Explain the purpose and objectives of an apprentice training program.
  - d. Describe how certified apprentice training can start in high school.
  - e. Describe what the *Clean Air Act* means to the HVAC trade.
  - f. Describe the types of regulatory codes encountered in the HVAC trade.
  - g. Identify the types of schedules/drawings used in the HVAC trade.
  
4. Demonstrate knowledge of drain, waste, and vent systems. MODULE 68115-09 – INTRODUCTION TO DRAIN, WASTE, AND VENT (DWV) SYSTEMS
  - a. Explain how waste moves from a fixture through the drain system to the environment.
  - b. Identify the major components of a drainage system and describe their functions.
  - c. Identify the different types of traps and their components, explain the importance of traps, and identify the ways that traps can lose their seals.
  - d. Identify the various types of drain, waste, and vent (DWV) fittings and describe their applications.
  - e. Identify significant code and health issues, violations, and consequences related to DWV systems.
  
5. Demonstrate an understanding of plastic pipe and fittings. MODULE 68116-09 – PLASTIC PIPE AND FITTINGS
  - a. Identify types of materials and schedules of plastic piping.
  - b. Identify proper and improper applications of plastic piping.
  - c. Identify types of fittings and valves used with plastic piping.
  - d. Identify and determine the kinds of hangers and supports needed for plastic piping.
  - e. Identify the various techniques used in hanging and supporting plastic piping.
  - f. Properly measure, cut, and join plastic piping.
  - g. Explain proper procedures for the handling, storage, and protection of plastic pipes.
  
6. Demonstrate an understanding of copper pipe and fittings MODULE 68117-09 – COPPER PIPE AND FITTINGS
  - a. Identify the types of materials and schedules used with copper piping.
  - b. Identify the material properties, storage, and handling requirements of copper piping.
  - c. Identify the types of fittings and valves used with copper piping.
  - d. Identify the techniques used in hanging and supporting copper piping.
  - e. Properly measure, ream, cut, and join copper piping.
  - f. Identify the hazards and safety precautions associated with copper piping.

## MINIMUM COURSE CONTENT

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

- I. Electrical Safety
- II. Residential Elect. Services
- III. Intro to HVAC
- IV. Intro to Drain Waste & Vent
- V. Plastic Pipe & Fittings
- VI. Copper Pipe & Fittings

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

### INSTRUCTIONAL METHODS

1. Lecture
2. Audio-Visual aids
3. Example and demonstration
4. Review of student applications
5. Class discussions
6. Field trips and guest speakers
7. Tests (written)
8. Skills tests (performance-based)

### **STUDENT REQUIREMENTS**

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. Students are required to take the 3<sup>rd</sup> party testing examination.

### **GRADING SCALE**

On objective materials, the following scale is used:

90-100 %	A
80-89 %	B
70-79 %	C
60-69 %	D
0-59 %	F

NCCER standards will be applied when assessing lab work.

### **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**

