

**NEOSHO COUNTY COMMUNITY COLLEGE  
MASTER COURSE SYLLABUS**

**COURSE IDENTIFICATION**

Course Code/Number: HVAC 103

Course Title: Electrical Fundamentals

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

Credit Hour(s): 4

Effective Date: Fall 2014

Assessment Goal Per Outcome: 80%

**COURSE DESCRIPTION**

This course teaches power generation and distribution, and electrical components; explains the theory of solid-state electronics, Ohm's Law, wiring diagrams, as well as the operation, use and testing of the various electronic components used in HVAC; and covers transformers, single-phase and three-phase power distribution, capacitors, the theory and operation of induction motors. Students will construct and test both series and parallel circuits. Additionally, the student learns how to solve problems involving the measurement of lines, area, volume, weights, angles, pressure, vacuum, and temperature.

**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)

Students will be able to:

### **OUTCOME 1: Demonstrate an understanding of electricity.**

#### **Competencies:**

1. State and demonstrate the safety precautions that must be followed when working on electrical equipment and circuits.
2. State how electrical power is distributed.
3. State how AC and DC electricity are different.

### **OUTCOME 2: Use calculations to determine current, voltage, resistance, and power.**

#### **Competencies:**

1. Review math principles pertaining to basic algebraic equations.
2. Apply Ohm's law to calculate the current, voltage, and resistance in a circuit.
3. Apply the power formula to calculate how much power is consumed by a circuit.
4. Describe how voltage, current, resistance, and power are related.

### **OUTCOME 3: Demonstrate an understanding of circuits.**

#### **Competencies:**

1. Describe the difference between series and parallel circuits and calculate loads in each.

2. Construct parallel circuits
3. Construct series circuits
4. Construct combination parallel and series circuits

**OUTCOME 4: Demonstrate practical knowledge of electrical diagrams and electrical components.**

**Competencies:**

1. Read and interpret common electrical symbols.
2. Read and interpret electrical diagrams.
3. Describe the purpose and operation of the various electrical components used in HVAC equipment.
4. Perform voltage, current, and resistance measurements using electrical test equipment.

**MINIMUM COURSE CONTENT**

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

1. Electrical Safety
2. Ohm's Law and Power Formula
3. Alternating and Direct Current
4. Power Distribution
5. Series and Parallel Circuits
6. Electrical Symbols and Diagrams
7. Electrical Components in HVAC

**NCCER Modules Covered in Course:** 03102-07 Trade Math, 03106-07 Basic Electricity, 03206-07 Alternating Current, 03207-07 Basic Electronics

**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**