

## COURSE SYLLABUS

<b>LAST REVIEW</b>	Fall 2022
<b>COURSE TITLE</b>	Electrical Controls (Motors) I
<b>COURSE NUMBER</b>	HVAC 0232
<b>DIVISION</b>	Career and Technical Education
<b>DEPARTMENT</b>	HVAC
<b>CIP CODE</b>	47.0201
<b>CREDIT HOURS</b>	1
<b>CONTACT HOURS/WEEK</b>	Class: 0.5                      Lab: 1
<b>PREREQUISITES</b>	HVAC 0100

### COURSE DESCRIPTION

This course will give students a basic understanding of electric motors. The course will cover starting and running components, motor speeds, power supplies, single and split-phase motors.

### PROGRAM ALIGNMENT

This course is part of a program aligned through the Kansas Board of Regents and Technical Education Authority. For more information, please visit:

[https://kansasregents.org/workforce\\_development/program-alignment](https://kansasregents.org/workforce_development/program-alignment)

### PROGRAM LEARNING OUTCOMES

1. The student will be able to demonstrate the ability to perform HVAC procedures in a safe manner
2. The student will be able to classify the different needs of equipment and summarize a solution.
3. The student will be able to exhibit a high level of professionalism including appropriate dress, attendance, communication skills and other soft skills necessary.

### TEXTBOOKS

<http://kckccbbookstore.com/>

### METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom.

Methodology will be selected to best meet student needs.

## **COURSE OUTLINE**

- I. Types of Electrical Motor.
  - A. Uses of electric motors.
  - B. Parts of an electric motor.
  - C. Determining a motor's speed.
    - 1.  $S \text{ (rpm)} = \text{Frequency} \times 120$  divided by the number of poles
    - 2. Frequency is the number of cycles per second (also called hertz)
  - D. Single Phase open motors.
  - E. Split phase motors.
  - F. Capacitor start motors
  - G. Permanent split capacitor motors.
  - H. Three phase motors.
  - I. Single phase hermetic motors
  - J. Two speed compressor motors
    - 1. Application of Motors
  - K. The power supply
    - 1. Voltage
    - 2. Current capacity
    - 3. Frequency
    - 4. Phase
  - L. Motor Mounting Characteristics
    - 1. Cradle mount motors
    - 2. Rigid base mount motors
    - 3. End mount motors
    - 4. Belly band mount motors

## **COURSE LEARNING OUTCOMES AND COMPETENCIES**

Upon successful completion of this course, the student will:

- A. Demonstrate an understanding of single phase motors.
  - 1. Demonstrate a 120 volt motor application.
  - 2. Demonstrate a 240 volt motor application.
- B. Demonstrate an understanding of multispeed permanent split capacitor motors.
  - 3. Demonstrate knowledge of a capacitor-start motor.
  - 4. Demonstrate knowledge of a capacitor-start, capacitor-run motor.
- C. Explain the operation of a three phase motor.
  - 5. Explain used in heavier commercial or industrial use.
  - 6. Demonstrate voltages of 360 volts or 460 volts.
  - 7. Explain why no, start accessories needed.

8. Explain why (PSC) motors cost more
- D. Demonstrate an understanding of the proper power supply for a motor.
  9. Demonstrate the use of residential motors:
    10. Demonstrate 120 volt motor.
    11. Demonstrate 240 volt motor.
    12. Demonstrate commercial or industrial motors:
      13. Demonstrate 360 volts use.
      14. Demonstrate 440 volts use.
    15. Explain the higher cost of purchase of industrial motors.
  - D. Demonstrate an understanding of the different types of motor mounts.
    16. Demonstrate a cradle mount for motors.
    17. Demonstrate a rigid base mount for motors.
    18. Demonstrate an end mount for motors.
    19. Demonstrate a belly band mount for motors.

### **ASSESSMENT OF COURSE LEARNING OUTCOMES AND COMPETENCIES**

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

### **COLLEGE POLICIES AND PROCEDURES**

*Student Handbook*

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

*College Catalog*

<https://www.kckcc.edu/academics/catalog/index.html>

*College Policies and Statements*

<https://www.kckcc.edu/about/policies-statements/index.html>

*Accessibility and Accommodations*

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.