

COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	Electrical Controls (Motors) II
COURSE NUMBER	HVAC 0233
DIVISION	Career and Technical Education
DEPARTMENT	HVAC
CIP CODE	47.0201
CREDIT HOURS	2
CONTACT HOURS/WEEK	Class: 1 Lab: 2
PREREQUISITES	HVAC 0100

COURSE DESCRIPTION

This course will give students an understanding of electric motors. The course will cover centrifugal switches, shaded-pole motors, three-phase motors, single-phase hermetic motors, two speed motors, and variable speed motors. The course will also cover application of motors, motor controls, and troubleshooting electric 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

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://kckccbookstore.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. Motor Controls
 - A. Introduction to Motor Control Devices.
 - B. The Relay
 - C. The Contactor
 - D. Motor Starters
- II. Troubleshooting Electric Motors
 - A. Mechanical Motor Problems
 - B. Belt Tension
 - C. Pulley Alignment
 - D. Checking Capacitors

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

- A. Describe the use of variable speed motors.
 - 1. Explain that variable speed motors are used in many applications as most motors do not need to operate at full speed and load except during the peak temperature of the season.
 - 2. Demonstrate a furnace blower motor.
 - 3. Demonstrate a condensing fan motor.
 - 4. Demonstrate a compressor motor.
- B. Demonstrate an understanding of three phase and single phase motors
 - 5. Explain what are hertz.
 - 6. Explain what full-load amperage means to motors.
 - 7. Explain what run-load amperage means to motors.
 - 8. Explain what locked-rotor amperage means to motors.
 - 9. Explain phase shift.
 - 10. Demonstrate an explosion-proof motor.
 - 11. Describe the motor service factor.
 - 12. Describe what a drip proof motor can do.
 - 13. Explain the phase difference relationship.
- C. Demonstrate an understanding of the different types of electric motor problems.
 - 14. Demonstrate mechanical motor problems and solutions.
 - 15. Demonstrate how to adjust belt tension.
 - 16. Demonstrate how to adjust pulley alignment.
 - 17. Demonstrate how to check capacitors for micro-farads.
 - 18. Explain how the motor windings work.
 - 19. Explain the importance of wiring and connectors.

- D. Identify various mechanical problems in electric motors.
20. Describe the purpose of valve plates in motors.
 21. Identify the different types of motor gaskets.
 22. Demonstrate bearings maintenance
 23. Demonstrate how to properly check the oil levels.
 24. Explain the law of friction applied to motors.
 25. Explain the problem of excessive heat.

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>.