COURSE SYLLABUS

LAST REVIEW	Fall 2022
COURSE TITLE	AC/DC Circuits I
COURSE NUMBER	ELET 0130
DIVISION	Career and Technical Education
DEPARTMENT	ELET
CIP CODE	46.0302
CREDIT HOURS	4
CONTACT HOURS/WEEK	Class: 1 Lab: 6
PREREQUISITES	None

COURSE DESCRIPTION
The purpose of the course is to provide the student an introduction to the basic principles of electricity including sources of direct (D.C.) and voltage. The student will learn Ohm's and Kirchhoff's Laws by working test and pictorial problems. They then will apply the knowledge in the laboratory. Software will also be utilized alongside learning the theories, and to back up the lab work. This is a foundation course of basic knowledge, skills, and aptitude preparing the student for more advanced electronics courses.

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 identify workplace safety issues in accordance with OSHA standards.
2. Upon successful completion of this course, the student should be able to identify the job skills necessary to have a successful career in the Electrical Profession.
3. Inspect electrical circuit connections in accordance with the N.E.C. standards of compliance.

TEXTBOOKS
http://kckccbookstore.com/

METHOD 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. Demonstrate and understanding of:
   A. Sources of A.C. and D.C. Electricity
   B. Principles of generators and batteries
   C. Principles of series, parallel, and series-parallel circuits
   D. Principles of reasoning of bridges and voltage-divider networks.
II. Use of a Scientific/Engineering calculator to analyze currents and voltage through an A.C./D.C. Circuit
III. Ohm's Law solving for A.C./D.C. voltage, current and resistance
IV. Know the Basic Electrical Symbols
V. Know the resistor color codes
VI. Multi-meter measurement of A.C./D.C. voltage, current, ohms and frequency
VII. A.C. vs. D.C. voltage and current
VIII. Induction and RL Circuits
IX. Learn the make-up and use of generators and batteries
X. Basic semiconductor theory.
XI. Recognize and draw series, parallel, and series-parallel circuits
XII. Learn the practical application of full-wave and half-wave bridge rectifiers
XIII. Cover the use of PC software where A.C./D.C. circuit input can be analyzed
XIV. Learn the use of analog and digital Voltmeters
XV. Learn the use and reading of Megohm meters

COURSE LEARNING OUTCOMES AND COMPETENCIES

Upon successful completion of this course, the student will:

A. Describe and apply Ohms, Watts, and Kirchoff laws.
   1. Plot current flow from source to workload.
   2. Measure current in a circuit.
   3. Measure resistance in a circuit.
   4. Measure power in a circuit.
   5. Measure voltage in a circuit.
   6. Wire a series circuit.
   7. Wire a parallel circuit.

B. Define, demonstrate, and apply the characteristics of series, parallel, and combination circuits.
   8. Solve for resistance in series circuits.

9. Solve for voltage in series circuits.
10. Solve for amperage in series circuits.
11. Solve amperage in parallel circuits.
12. Solve voltage in a parallel circuit.
13. Determine resistance in a parallel circuit.
14. Determine resistance in a series-parallel circuit.
15. Identify characteristics of a series circuit.
16. Identify characteristics of a parallel circuit.
17. Identify characteristics of a series-parallel circuit.

C. Explain DC theory concepts.
18. Describe the make-up of batteries.
19. Demonstrate how batteries use chemicals to produce direct current power.
20. Explain why D.C. energy speed can be controlled.
21. Display a sine wave of D.C. electricity
22. Determine which type of battery life is more durable.
23. Draw a full-wave bridge rectifier.
24. Draw a half-wave rectifier.
25. Demonstrate the flow of electricity in a bridge rectifier.
26. Define the characteristics of different battery types.

D. Explain A.C. theory concepts.
27. Use a metering device to explain A.C./D.C. electricity.
28. Explain A.C./D.C. components.
29. Explain characteristics of different A.C./D. C. sources.

E. Perform and interpret electrical measurements using industry standard equipment.
30. Measure current with an ammeter.
31. Measure voltage with voltmeter.
32. Measure resistance with ohmmeter.

F. Explain the use of analog and digital voltmeters
33. Demonstrate procedure for using an analog voltmeter.
34. Demonstrate procedure for using digital voltmeter.

G. Analyze series and parallel resonate circuits and evaluate the effects of capacitive/inductive reactance and impedance.
35. Explain resonance.
36. Show a graph of capacitive/inductive reactance.
37. Use a formula to determine impedance.

H. Explain the components of generators and battery elements.
38. Describe the make-up of generators.
39. Demonstrate how generators produce alternating current

40. Explain the different types of generators.
41. Explain the different characteristics in generators.

I. Understand the use of a scientific calculator to analyze currents and voltage through a simple A.C./ D.C. circuit.
42. Demonstrate Ohm's law using a calculator for A.C./D.C. circuits.

J. Read and understand electric and electronic schematics.
43. Read and understand electronic schematics.
44. Explain different components of an electronic schematic.
45. Explain the function of an electronic component.
46. Determine the operation of the circuit.

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.