Course Information

Division: Industrial Technology Education
Course Number: ELT 112
Title: AC Electrical Systems
Credits: 3
Developed by: Charles A. Smith
Lecture/Lab Ratio: 2 Lecture/3 Lab
Transfer Status:

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<td>EET Dept Elective</td>
<td>CTE Departmental Elective</td>
<td>Non Transferable</td>
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Activity Course: No
CIP Code: 47.0105
Assessment Mode: Pre/Post Test (57 Questions/100 Points)
Semester Taught: Fall
GE Category: None
Separate Lab: No
Awareness Course: No
Intensive Writing Course: No

Prerequisites
None

Educational Value
To General Education: Elective Credit

Description
This course is an introductory course of Alternating Current (AC) theory and systems with a heavy emphasis on industrial application and settings. The course will introduce the student to transformers, electrical measuring test equipment, single and polyphase motors, motor controls, AC generation, and troubleshooting skills.

Supplies
Scientific Calculator
Competencies and Performance Standards

1. Examine the characteristics of Alternating Current Electricity

Learning objectives
What you will learn as you master the competency:

a. Analysis of series RL, RC, RLC circuits
b. Analysis of Parallel RL, RC, RLC circuits
c. Analysis of Series Parallel RL RC, RLC circuits
d. Identify characteristics of Inductance and Capacitance
e. Analysis of Inductive Reactance and Capacitance Reactance
f. Classification of Frequency, Cycle and Period
g. Evaluate peak, rms and average values of sine wave
h. Define and calculate Impedance
i. Comprehend and calculate Phase angle and power factor
j. Explore the use of polar and rectangular quantities
l. Calculate resonant frequency
m. Compare High, Low and Band pass filters

Performance Standards
Competence will be demonstrated:

- in class discussion
- group practice
- using model electrical circuits
- written tests

Criteria - Performance will be satisfactory when:

- learner completes written test to 70% correct
- learner manipulates model circuit to accomplish assigned test

2. Implementation of AC Test Equipment

Learning objectives
What you will learn as you master the competency:

a. Demonstrate how to read Voltage, Current, and Resistance in an AC Circuit
b. Explain the proper use of a Voltmeter
c. Demonstrate the proper use of an Ammeter
d. Demonstrate the proper use of an Ohmmeter
e. Determine proper usage of AC and DC Power Supplies
f. Explain use of a Megger
g. Assess the use of an Oscilloscope
h. Examine the use of Pulse and Signal Generators
i. Describe the use of a frequency counter

Performance Standards
Competence will be demonstrated:

- in class discussion
- in group practice
- using test equipment
3. Transformers

**Learning objectives**

*What you will learn as you master the competency:*

a. Analysis of Single phase stepup and stepdown transformers
b. Explore the use of Polyphase stepup and stepdown transformers
c. Assessment of Delta and Wye transform configuration
d. Calculate turns ratio and primary or secondary voltages
e. Calculate transform Power VA and KVA ratings
f. Analysis of Instrument transformers Current (CT) and Potential (PT)
g. Test transformer insulation using a Megger
h. Analysis of transformer polarity
i. Compare methods of transformer cooling systems

**Performance Standards**

*Competence will be demonstrated:*

- in class discussion
- group practice
- using model electrical circuits
- written tests

*Criteria - Performance will be satisfactory when:*

- learner completes written test to 70% correct.
- learner manipulates model circuit to accomplish assigned task

**Types of Instruction**

Lecture / modeling
Electrical lab assignments
Group practice
Individual projects / presentations

**Grading Information**

**Grading Rationale**

Final Exam – 35%
Chapter Exams – 35%
Lab Assignments – 20%
Attendance – 10%
**Grading Scale**

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