

ISET-1410: APPLIED ELECTRICITY I

Cuyahoga Community College

Viewing: ISET-1410 : Applied Electricity I

Board of Trustees:

January 2024

Academic Term:

Fall 2024

Subject Code

ISET - Integrated Systems Engineering

Course Number:

1410

Title:

Applied Electricity I

Catalog Description:

Fundamentals of electricity with emphasis on resistance, direct current voltage and current, electrical quantities and units of measurements. Ohm's Law, Kirchoff's voltage and current laws will also be covered.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

MATH-0915 Basic Arithmetic and Pre-Algebra, or appropriate Math placement score.

Outcomes

Course Outcome(s):

Identify safe practices for working with DC circuits according to OSHA standards.

Objective(s):

1. Explain the use of "ground."
2. Locate the grounded conductor.
3. Apply grounding techniques.

Course Outcome(s):

Use electrical measuring instrumentation.

Objective(s):

1. Recognize different types of meters.
2. Identify the difference between analog and digital measurements.
3. Measure voltage across resistors in a series circuit.
4. Measure voltage across resistors in a parallel circuit.
5. Measure current in series and parallel circuits.

Course Outcome(s):

Relate electrical symbols to proper electrical terms.

Objective(s):

1. Recognize basic electrical symbols.
2. Identify electrical terms.
3. Sketch electrical symbols.

Course Outcome(s):

Apply Ohm's and Kirchoff's voltage and current laws to calculate voltage and current.

Objective(s):

1. Use appropriate terminology.
2. Calculate voltage drops in series circuits.
3. Calculate current in parallel circuits.
4. Calculate power consumption in a DC circuit.

Course Outcome(s):

Design and evaluate a DC circuit.

Objective(s):

1. Calculate a simple lighting circuit.
2. Calculate a simple fan circuit.
3. Build simple DC circuits.
4. Compare calculated values to measured values.

Course Outcome(s):

Explain Ohm's and Kirchoff's Law to internal/external customers.

Objective(s):

1. Describe a parallel circuit.
2. Interpret Kirchoff's Law.
3. Sketch a simple Direct Current (DC) circuit.
4. Differentiate between volts, amps, and ohms.
5. Calculate voltage, resistance, and current.
6. Describe a series circuit.

Methods of Evaluation:

1. Completion of homework assignment
2. Written and verbal quizzes covering homework and in class demonstrations
3. Lab Assignments
4. Final exam

Course Content Outline:

1. CONCEPTS
 - a. Lock-out/tag-out
 - b. Electrical terminology, symbols, and schematics
 - c. Matter (electrons)
 - d. Ohm's Law
 - e. Principles of Direct Current (DC)
 - f. AWG
 - g. Conductors
 - h. Kirchoff Voltage Law (KVL)
 - i. Kirchoff Current Law (KCL)
 - j. Series & Parallel circuit configurations
 - k. Meters types and applications

- l. Work [National Electric Code (NEC)]
 - m. Safety (codes)
 - n. Grounding
 - o. Flowcharting
 - p. Troubleshooting
 - q. Tooling components
 - r. Raceways
 - s. Measurement systems (U.S. Customary & Metric)
2. SKILLS
- a. Calculate current, voltage, resistance, and power in DC circuits
 - b. Installing wire for circuits
 - c. Build simple DC circuits
 - d. Reading instrumentation (meters)
 - e. Troubleshooting (fundamentals)
 - f. Creating troubleshooting flow charts
 - g. Communication skills
 - h. Safety rule application
 - i. Customer Service
 - j. Interpreting schematics and drawings
 - k. Interpreting National Electric Code (NEC)
 - l. Locating additional resources for materials & troubleshooting
 - m. Interpreting drawings & schematics that are dimensions in U.S customary & metric units.
 - n. Select proper measuring and hand tools for specific jobs.
 - o. Discussing proper fastening techniques.
 - p. Maintenance procedures
3. ISSUES
- a. Networking
 - b. Safe installations
 - c. Design for future growth
 - d. Taking concept and applying it
 - e. Troubleshooting
 - f. Inability to identify problem

Resources

Boylestad, R. L. (2022) *Introductory Circuit Analysis*, Prentice Hall.

Floyd, T. (2020) *Principals of Electric Circuits*, Pearson.

Nilsson, J. W. and Riedel, S. (2023) *Electric Circuits*, Pearson.

Paynter, R and Boydell, B.J. (2021) *Electronics Technology Fundamentals*, Pearson.

Robbins, A. H. and Miller, W. C. (2020) *Circuit Analysis, Theory and Practice*, Delmar Centgace Learning.

Kubala, T. (2022) *Electricity I, Devices, Circuits, Materials*, Cengage Learning.

Resources Other

1. Amatrol Software

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