

**OHLONE COLLEGE**  
**Ohlone Community College District**  
**OFFICIAL COURSE OUTLINE**

**I. Description of Course:**

1. **Department/Course:** ETEC - 106
2. **Title:** Electronics for Technology
3. **Cross Reference:**
4. **Units:** 3  
**Lec Hrs:** 2  
**Lab Hrs:** 3  
**Tot Hrs:** 90.00
5. **Repeatability:** No
6. **Grade Options:** Grade Only (GR)

7. **Degree/Applicability:**  
Credit, Degree Applicable, Transferable  
- CSU (T)
8. **General Education:**
9. **Field Trips:** Not Required
10. **Requisites:**  
**Advisory**  
Knowledge of basic algebra and  
trigonometric relationships.

**12. Catalog Description:**

This class is an introduction to Electricity and Electronic Devices. Students will learn the basic theory of electricity and apply that knowledge to build, test and troubleshoot electrical circuits. In the lab, students will learn to operate the test and measurement instrumentation necessary to support construction of electrical circuits.

**13. Class Schedule Description:**

Introduction to basic electrical devices and circuits. Hands on labs to study behavior of various DC and AC circuits.

**14. Counselor Information:**

This class is required for all Engineering Technology students.

**II. Student Learning Outcomes**

The student will:

1. Describe the relationship of electric charge, current and electrical potential. Define the parameters which affect their value.
2. Explain the behavior of conductors, insulators and semiconducting materials using the Atomic Model. Describe the various sources of electric potential.
3. Demonstrate the transient and steady state behavior of the basic passive electrical components - resistors, capacitors, and inductors. Describe the effect of these components in the electrical circuits for both Alternating and Direct Current Inputs.
4. Identify the function of various electrical test and measurement equipment. Operate power supplies and function generators and use VOM (volt, ohm meters) and Oscilloscopes to observe the behavior of electrical circuits.
5. Apply Ohm's Law to analyze circuit behavior. Apply Kirchoff's Law, Thevenin's Theorem, the Law of Circuit Superposition, and other techniques to calculate circuit parameters.

**III. Course Outline:**

- A. Electricity and Materials
  - 1. Atomic Structure and Material Behavior
  - 2. Electric Potential and Electrostatic Force
  - 3. Sources of Voltage Potential
  - 4. Electrical Properties of Material
- B. Voltage and Current
  - 1. Electric Circuits
  - 2. Charge and Current
  - 3. Resistance
  - 4. Ohm's Law
  - 5. Resistance Circuits
    - a. Series Resistance
    - b. Parallel resistance
- C. Circuit Analysis
  - 1. Circuit Symbols
  - 2. Electric Circuits and Electrical Equations
  - 3. Techniques for Circuit Analysis
    - a. Superposition Theorem
    - b. Thevenin Theorem
    - c. Kirchoff's Laws
  - 4. Solving Multi-loop Circuits
- D. Using Electrical Testing and Measurement Equipment
  - 1. Multimeters
  - 2. Power Supplies and Frequency Generators
  - 3. Oscilloscopes
- E. Direct Current and Alternating Current Circuits
  - 1. Power
  - 2. Energy Transformation
  - 3. RMS Values
  - 4. Impedance and Vectors
- F. Capacitance
  - 1. Transient Behavior
    - a. Current and Voltage
    - b. Time Constant
  - 2. Steady State
  - 3. Alternating Current Circuits
  - 4. Capacitance and Impedance
  - 5. Resistive Capacitance Series Circuits
  - 6. Resistive Capacitance Parellel Circuits
  - 7. Combinational RC Circuits
- G. Magnetism
  - 1. Magnetism and Electricity
  - 2. Current and Magnetic Fields
  - 3. Inductance
  - 4. Electromagnetic Devices
    - a. Electro Magnet
    - b. Solenoids

- c. Transformers
- d. Generators
- e. Motors

#### H. Inductors

- 1. Transient Behavior
  - a. Current and Voltage
  - b. Time Constant
- 2. Steady State
- 3. Alternating Current Circuits
- 4. Inductance and Impedance
- 5. Resistive Inductance Series Circuits
- 6. Resistive Inductance Parallel Circuits
- 7. Combinational LC Circuits

#### I. Complex Electrical Circuits

- 1. RLC Circuits
- 2. High and Low Pass Filters
- 3. Circuit Impedance

### IV. Course Assignments:

#### A. Reading Assignments

- 1. Assignments from selected chapters from text book and selected Internet sites.

#### B. Projects, Activities, and other Assignments

- 1. Lab Ohm's Law
- 2. Lab Measure DC Voltage and Current
- 3. Lab Build Series and Parallel Resistor Circuits
- 4. Lab Determine Maximum Power
- 5. Lab Study Transient and Steady State Behavior of Capacitors
- 6. Lab Build Series and Parallel Capacitor Circuits
- 7. Lab Study Transient and Steady State Behavior of Inductors
- 8. Lab Build Series and Parallel Inductor Circuits
- 9. Lab Build RC Series Circuits
- 10. Lab Build RC Parallel Circuits
- 11. Lab Build RL Series Circuits
- 12. Lab Build RL Parallel Circuits
- 13. Lab Build RLC Circuits

#### C. Writing Assignments

### V. Methods of Evaluation/Assessment:

- A. Examinations and Oral Presentations will be used to assess students grasp of key electrical concepts.
- B. Examinations and Oral Presentations will be used to assess student grasp of electrical behavior of different materials.
- C. Students will construct electrical circuits to demonstrate their understanding of the behavior of electrical components. Exams will be used to test their grasp of important concepts
- D. Students will use the various electrical test and measurement devices to analyze the electrical circuits they will construct in the lab.

- E. Examinations and other written exercises will be used to test students ability to apply Ohm's Law to circuit problems.
- F. Examination, demonstrations and completion of laboratory experimentation will be use to verify student understanding of relationship between Electrical and Magnetic properties.

**VI. Methods of Instruction:**

- A. Lecture
- B. Laboratory
- C. Discussion
- D. Demonstration
- E. Audiovisual

**VII. Textbooks:**

Recommended

1. Stephen L. Herman *Delmar's Standard Textbook of Electricity* fourth Edition, Delmar, 2008 ISBN: 13-978-14180658

Supplemental

**VIII. Supplies:**

- A. Calculator with trigonometric and log functions.

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