SYLLABUS
PART I
EDISON STATE COMMUNITY COLLEGE
ELT 110S CIRCUITS I
3 CREDIT HOURS

COURSE DESCRIPTION:

Presents the principles of resistance, capacitance, and inductance in direct current circuits. The student will develop a thorough understanding of the application of Ohm's Law, Kirchhoff's Laws and the power formula to series, parallel circuits, and series-parallel circuits. The use of metric prefixes, engineering notation, and equation manipulation will be emphasized. The student will be introduced to the use and care of digital multimeters. Prerequisite: One year of high school algebra or MTH 097D or any college-level math course. Lab fee.

COURSE GOALS:

The student will:

Bloom	Goal	Program
1	1. Define the terms electrical current, voltage, resistance, energy, power, and give the units for each.	1, 2, 4
2	2. Distinguish between a conductor, an insulator, and a semiconductor.	1, 2, 4
1	3. Identify capacitors, inductors, and resistor values based on color-coding.	1, 2, 4
2	4. Associate heat generated with current flowing through a resistor.	1, 2, 4
1	5. Describe the basic parts and operation of common types of storage batteries.	1, 2, 4
2	6. Distinguish a series circuit from a parallel circuit, from a series-parallel circuit.	1, 2, 4
1, 3	7. Define and apply Ohm's Law, and Kirchhoff's voltage and current laws.	1, 2, 4
1	8. Measure DC voltage and current in resistive networks.	1, 2, 4
3	9. Troubleshoot DC circuits and distinguish the effect of an open or a short.	1, 2, 4
1	10. Calculate time constants for RL and RC circuits.	1, 2, 4
1	11. Calculate the equivalent impedance of series-parallel circuits.	1, 2, 4
1	12. Measure and calculate voltages and currents in RLC circuits.	1, 2, 4
2	13. Recognize and explain loading effects.	1, 2, 4
3	14. Convert between equivalent current and voltage sources.	1, 2, 4
3	15. Apply Thevenin's, Norton's and superposition theorems to networks.	1, 2, 4
3	16. Apply the fundamental laws and rules of magnetism and electromagnetism.	1, 2, 4
4	17. Analyze series circuits, solve for current, voltage, resistance, and power.	1, 2, 4
4	18. Analyze parallel circuits, solve for current, voltage, resistance, and power.	1, 2, 4
4	19. Analyze series-parallel circuits, solve for current, voltage, resistance, and power.	1, 2, 4
3, 4	20. Apply mesh and nodal analysis techniques to analyze series-parallel circuits using up to 3 simultaneous equations with 3 unknowns.	1, 2, 4
2	21. Interpret properties of capacitors and explain their behavior under DC conditions (use exponentials and logarithmic functions to explain behavior of capacitors under DC conditions).	1, 2, 4
2	22. Interpret properties of inductors and explain their behavior under DC conditions (use exponentials and logarithmic functions to explain behavior of inductors under DC conditions).	1, 2, 4

CORE VALUES:

The core values are a set of principles that guide in creating educational programs and environments at Edison. They include communication, ethics, critical thinking, human diversity, inquiry/respect for learning, and interpersonal skills/teamwork. The goals, objectives, and activities in this course will introduce/reinforce these Core Values whenever appropriate.

TOPIC OUTLINE:

1. Nature of Electricity
2. Batteries
3. Conductors, Insulators, and Resistors
4. Measuring Current, Voltage, and Resistance
5. Ohm's Law, Kirchhoff"s Laws and Electrical Calculations
6. Series Resistive Circuits
7. Parallel Resistive Circuits
8. Series-Parallel Circuits
9. Network Analysis Techniques and Network Theorems
10. Magnetism and Electromagnetism
11. Inductance
12. Capacitance