

Course Code: ELT 150

Course Title: Introduction to Electricity and Electronics

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 15.0303

Repeatability: 0

Credit Hours

Catalog Notation: 2-2-3

Credit Hour Distribution:

Lecture: 2

Lab: 2

Clinical: 0

Total: 3

General Course Information

Catalog Description

Direct Current (DC) and Alternating Current (AC) circuits and test instruments. Following national skill standards for the Electronic Industries Alliance/Electronics Industries Foundation (EIA/EIF) to include work habits, basic and practical skills, and survey of motors, relays, and transformers.

General Course Objectives

Acquire educational foundation for understanding electrical and electronic circuits and systems. Acquire entry level skills recognized nationally by the Electronic Industries Association (EIA) and the Electronic Industries Foundation (EIF).

Minimum Placement Levels

English	Reading	Math
None	None	Placement out of MAT 060

Prerequisites

None

Methods of Evaluation

Students will be given a minimum of 1 objective exam with lab exercises, 1 objective final exam with lab exercises, and 10 lab exercises which may involve answering some pre-lab and post-lab questions, connecting circuits, and measuring voltage, current, and resistance.

Instructional Materials and Additional Supplies

Electrical Principles and Practices, 4th Edition. Mazur. ISBN# 9780826918116.

Safety Glasses

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Desirable Behavior and Work Habits (integrated into other segments)	<ol style="list-style-type: none"> Practice time management and follow schedules. Display respect towards other people. 	4	4	0
Technical Skills: safety, Ohm's law, DC circuits, AC circuits, discrete devices	<ol style="list-style-type: none"> Describe and demonstrate proper safety techniques for components, circuits, and electrical systems. 	1	1	0
Technical Skills: safety, Ohm's law, DC circuits	<ol style="list-style-type: none"> Identify color codes and component marking systems for passive, reactive, and active components. Describe sources of electricity in DC circuits. Explain the principle of operation of batteries. Describe the relationships of voltage, current, resistance, power, and energy in an electrical circuit. Describe the factors that affect the resistance of conductors and insulators. Calculate resistance, conductance, and voltage drops for conductors. Calculate circuit values using Ohm's Law for series, parallel, and series-parallel circuits. Describe the electrical characteristics of DC Series, Parallel, and Series-Parallel circuits and calculate expected electrical parameters for the circuits. Construct, troubleshoot, and measure circuit values for DC Series, Parallel, and Series-Parallel circuits. Describe the principles and operations of DC voltage divider circuits and perform circuit calculations for loaded and unloaded DC voltage dividers. Construct, troubleshoot, and measure circuit values for DC voltage divider circuits. Describe the principles and operations of DC RC time constant circuits and perform circuit calculations for RC time constants. Construct, troubleshoot, and measure circuit values for DC RC time constant circuits. Calculate and measure time constants using an oscilloscope. 	6	3	0
Technical Skills: AC circuits	<ol style="list-style-type: none"> Describe sources of electricity for AC circuits and explain the relationship between voltage, time, and current direction during the generation of an AC signal or power source. Discuss the electrical characteristics and shape of sinusoidal and non-sinusoidal wave forms. Explain the principles and operation of safety grounding systems (lightning arresters, ground fault interrupters, etc.) Explain Capacitive Reactance, Inductive Reactance, and Impedance in AC circuits and calculate X_C, X_L, and Z. Build from instructions AC circuits containing reactive components and measure electrical parameters using oscilloscopes and multi-meters. 	8	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Test Equipment and Tools: DC power source	<ol style="list-style-type: none"> Describe the operation of a DC Source. Identify the controls and connection points; properly connect circuits. Measure circuit values and compare to calculations. 	1	2	0
Test Equipment and Tools: multimeters	<ol style="list-style-type: none"> Describe the operation of a multi-meter. Identify the controls and connection points; properly connect circuits. Measure circuit values and compare to calculations. 	1	2	0
Test Equipment and Tools: oscilloscopes	<ol style="list-style-type: none"> Describe the operation of an oscilloscope. Identify the controls and connection points; properly connect circuits. Measure circuit values and compare to calculations. 	2	4	0
Test Equipment and Tools: soldering/equipment	<ol style="list-style-type: none"> Describe the tools and supplies required for electronic soldering. List the hazards and safety precautions when working with solder. Perform without assistance the correct soldering procedure for connecting wires and components. 	1	2	0
Basic and Practical Skills: communicating on the job, solving problems and critical thinking, proficiency in mathematics, measurements, proficiency in physics	<ol style="list-style-type: none"> Distinguish the procedural components of written, graphic, and oral instructions. Communicate information to others using the correct terminology, complete thoughts, sentences, and paragraphs. Demonstrate the ability to use a scientific calculator. Demonstrate proficiency in MAT 060 topics: ratio, proportion, percent, conversion of units, signed numbers, order of operations, formulas, basic equations, basic exponent laws, word phrases, and basic word problems. Demonstrate the correct application of formulas to circuit problems. Describe the relationship of electricity to matter and atoms. 	3	3	0
Electro-mechanisms, Servomechanisms, Motors and Motor Control Circuits, Relays and Relay Circuits, Protection Circuits, Types of Motors	<ol style="list-style-type: none"> Describe the function and operation of motors, relays, and circuit protection devices. Calculate fuse and circuit breaker sizes. List three general categories of motors and sub-divide the categories of AC and DC motors. Describe the relationship between load and rotational speed for a DC motor. Fabricate and test relay control circuits. 	3	3	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0