

Electronic Equipment Technology Certificate

Program Student Learning Outcomes		Analyze problems, isolate and describe the important components of a problem: what is given (design specifications, performance requirements and testing standards). Identify variables- known and unknown.	Represent problems in a visual form, such as a schematic, flow chart, diagram, data table, or model.	Validate strong fundamentals in the aptitude to formulate and solve problems by applying principles of mathematics, science and technology.	Prove the capacity to conduct an experiment, use laboratory materials, properly and safely, note observations accurately, precisely and describe procedures.	Effectively use software simulation and information acquisition tools to collect, analyze and interpret data. Develop proficiency in the use and application of new tools and methods from the field of math, science and technology.	Demonstrate the ability to be an independent and equal contributor on a team-based project. Be able to articulate the overall team project goals and roles of the members.
Course Abbreviation	Course Level Learning Competencies 						
CTE101	Count and apply arithmetic operations in the binary number system.	I		I			
	Apply conversion algorithms between different number systems.	I		I			
	Express numbers and symbols in a variety of digital codes, (i.e.: BCD, ASCII)	I		I			
	Explain the basic operations of Digital Logic gates.	I		I			
	Simplify expressions by using both Boolean algebra and Demorgan's theorems.	I		I			
	Use Karnaugh maps to simplify Boolean expressions and truth tables.	I	I	I			
	Write the Boolean output expression and/or develop a truth table for a given combinational logic circuit.	I	I	I			
	Design a combinational logic circuit for a given Boolean output expression and/or given truth table.	I	I	I			
	Apply combinational logic to a system application.	I	I	I			
	Use NAND and NOR gates only to implement combinational logic.	I	I	I			
	Describe the logic functions of the comparator, adder, code converter, encoder, decoder, multiplexer, demultiplexers.	I	I	I			
	Demonstrate the use of the electronics simulation software Multisym	I	I	I	I	I	
	Apply flip-flops in basic application in counters and shift registers	I	I	I			
CTE103	Identify common logic functions by wiring and testing basic TTL digital gates.	I	I	I	I	I	I
	Construct, analyze and troubleshoot combinational logic circuits from both a circuit schematic and Boolean expression.	I	I	I	I	I	I
	Design a combinational logic circuit that will perform a stated task by first defining the logic function with a truth table and then determining the simplified circuit solution using Karnaugh mapping and/or Boolean algebra.	I	I	I	I	I	I
	Construct and test the operation of SR and D latches and JK flip-flops.	I	I	I	I	I	I
	Build, test and troubleshoot sequential circuits, including shift registers and counters.	I	I	I	I	I	I
	Simulate and test digital circuits by using MultiSym	I	I	I	I	I	I
	Define voltage, current and resistance and discuss the characteristics of each.	R					
	Discuss basic circuit concepts. Discuss the importance of electric circuits.	I					

CTE111	Discuss voltage and current sources.	I					
	Explain the characteristics of basic circuit elements through terminal descriptions, volt-ampere relationships and energy consumption/storage properties.	I					
	Calculate and solve simple circuits using Ohm's law, Kirchhoff's laws and the properties of the elements. Build, Test, Trouble-shoot and simulate circuits.	I	R	R	R	R	R
	Enhance basic problem-solving skills through organizing available information and applying circuit laws.	I	R	R			
	Solve circuit problems systematically using nodal analysis and mesh analysis. Build, Test, Trouble-shoot and simulate circuits.	I	R	R	R	R	R
	Augment advanced problem-solving skill by systematically formulate a circuit problem into a linear algebra problem.	I	R	R			
	Use circuit theorems to simplify circuit analysis, develop insight into the relationship between the inputs and the outputs, and how changing parameters may affect this relationship. Build, Test, Trouble-shoot and simulate circuits.	I	R	R	R	R	R
Supplement strong problem-solving skills by effectively formulating circuit problems into mathematical problems using circuit laws and theorems.	I	R	R				
CTE112	Calculate the steady state response of a circuit using the phasor concept.	I	R	R			
	Calculate the impedance and the admittance of passive circuits. Build, Test, Trouble-shoot and simulate circuits.	I	I	R	R	R	R
	Apply mesh and nodal analysis, superposition, source transformation, Thevenin and Norton's Theorems to passive circuits containing independent AC sources. Build, Test, Trouble-shoot and simulate circuits.	R	R	R	R	R	R
	Apply different power concepts like the apparent and average power, power factor and complex power to circuits.	I	R	R			
CTE201		I	I	I		I	I
	Analyze the voltage-current characteristic curve of a diode, discuss the operation of diodes and explain the three diode models.	R	R	R			R
	Explain and analyze the operation of both a half-wave and full-wave rectifiers and analyze the operation and characteristics of power supply filters and regulators.	R	R	R		R	
	Describe the characteristics of a zener diode and analyze zener diode operations and explain how a zener diode can be used in voltage regulation.	R	R	R		R	
	Discuss the transistor currents and their relationships and discuss how a transistor is used as an amplifier and a switch.	R	R	R		R	
	Discuss the concept of transistor dc biasing and analyze different dc biasing techniques.	R	R	R		R	
	Discuss and analyze the operation of CC, CE and multistage transistor amplifiers.	R	R	R		R	
Be able to assemble, test, troubleshoot and computer simulate circuits containing semiconductor devices in a lab environment.	R	R		R	R	R	
CTE202	Discuss and analyze the operation of BJT Common Emitter, Common Base, Class A, B, AB and C power amplifiers.	R	R	R		R	R
	Discuss and analyze Junction Field Effect Transistors (JFET) biasing & transconductance, including JFET amplifiers and switches.	R	R	R		R	R
	Discuss and analyze Metal Oxide Semiconductors (MOSFET) depletion & enhancement modes.	R	R	R		R	R
	Discuss and analyze frequency effects on electronic amplifiers, including Decibels, Impedance matching, Bode plots and Transient/Bandwidth relationships.	R	R	R		R	
	Explain and analyze Differential Amplifiers, both DC & AC analysis, and Operational Amplifier, including negative feedback.	R	R	R		R	
	Explain and analyze Oscillators.	R	R	R		R	
	Be able to assemble, test, troubleshoot and computer simulate circuits containing semiconductor devices in a lab environment.	R	R	R	R	R	R

