Couse Abbreviation	Program Student Learning Outcomes *Course Level Learning Competencies* ↓	**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 engineering technology and the technical skills needed to support engineering activities, particularly in the design, testing, and manufacture of products, systems, and devices.**	**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, engineering 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.**
EST104	Use MATLAB to program solutions to technical problems and projects.	I	I	I	I	I	
	Use EXCEL spreadsheets to analyze and present data;		I	I	I	I/R	
	Work cooperatively in teams;				I	I	I
	Design solutions to technical problems;	I		I/R			
	Communicate effectively in oral, written, and multimedia formats;		I				I
	Demonstrate a basic knowledge of major concepts related to science and technology, including current theories, historical and data trends, and empirical findings.	I	I	I			
	Demonstrate an ability to critically read, evaluate and interpret research findings and/or theories and draw reasonable conclusions. This may include supporting or rejecting a hypothesis or theory, analyzing case studies, and/or providing alternative explanations.	I		I			
	Demonstrate an ability to transfer, adapt, and apply prior knowledge to science and technology related issues and develop new understandings.			I			
	Demonstrate an ability to identify reliable sources of information from a variety of resources, including libraries, websites, journals, magazines, newspapers, etc.		I				
EST110	Utilize sketching as a design tool	I	I	I	I		I
	Demonstrate an understanding of layout concepts for 2-d plans	I	I	I	I		I
	Implement proper drafting techniques to create orthographic projections	I	I	I			I
	Discuss the uses of AutoCAD in the field of Design, Manufacturing, and En	I	I	I	I	I	I
	Create simple 2-d AutoCAD drawings that reflect a real world applications	I	I	I	I	I	I
PHS131	Understand fundamental principles and concepts in physics to apply to engineering problems.	I	I	I			
	Perform hands-on experiments, collect, analyze and understand data to provide conclusions.				I	I	I
	Demonstrate and apply knowledge of major scientific or technology concepts learned in class during lab hours	I		I	I		I
	Evaluate the validity and limitations of science and technology claims in the textbook by analyzing lab data if applicable		I	I		I	
	Understand fundamental physical concepts beyond mechanics	I	I	M	R	I	I

PHS132	Understand applications of covered physical concepts	I			R		R
	Learn mathematical relationships and computational techniques to quantify physical phenomena		R	M			
	Perform hands-on experiments, collect and analyze data	R	I	R	M	R	M
	Demonstrate and apply knowledge of major scientific or technology concepts learned in class during lab hours		R		M	R	M
	Evaluate lab measurement accuracy limitations relative to theoretical relationships	I	R		R	R	R
	Growth in teamwork via joint laboratory efforts	R	R		R	R	M
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, demultiplexes.	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					
	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					
CTE111	Calculate and solve simple circuits using Ohm's law, Kirchhoff's laws and the properties of the elements. Build, Test, Trouble-shoot ansd 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 ansd 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 ansd	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			
	Calculate the steady state response of a circuit using the phasor concept.	I	R	R			
CTE112	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			
	Perform vector addition, dot product, and cross product.	I	I	I			I
	Calculate the moment of a force creates about a specified axis.	I	I	I			I
	Reduce simple distributed loadings to an equivalent resultant force and position of application.	I	I	I			I
	Select and isolate free bodies, and construct a free-body diagram.	I	I	I			I
EST211	Using the equations of equilibrium, calculate appropriate reaction forces and moments for statically determinate structures.	I	I	I			I
	Isolate members of a frame and machine, construct free-body diagrams, and calculate the static equilibrium loading on each member.	I	I	I			I
	Apply the method of joints and method of sections to analyze forces in rigid truss networks.	I	I	I			I
	Utilize the method of sections to determine the internal shear and moment along the length of a loaded member (shear and moment diagrams).	I	I	I			I
	Understand the concept of dry friction and analyze the equilibrium of rigid bodies subjected to frictional forces.	I	I	I			I
	Determine the location of center of gravity and centroid for s system of discrete particles and a body of arbitrary shape.	I	I	I		I	I
	Apply the rectilinear motion equations to problems in kinematics and kinetics.	I	I	I			I
	Understand the concepts of normal and tangential acceleration.	I	I	I			I
	Apply vector principles to the analysis of planar kinematics of the slider crank and four bar linkage.	I	I	I			I

EST212	Apply the vector based rotating frames equation to solve kinematic problems involving rotating sliders.	I	I	I			I
	Set up free body diagrams for rigid bodies.	I	I	I			I
	Apply Newton's laws to particles, systems of particles, and rigid bodies in planar motion.	I	I	I			I
	Apply the moment equation about different points to rigid bodies in planar motion.	I	I	I			I
	Calculate the moment of inertia of a rigid body and apply the parallel axis theorem.	I	I	I		I	I
	Apply the principle of work and energy to planar rigid bodies.	I	I	I			I
	Apply the principle of conservation of angular momentum to planar rigid bodies.	I	I	I			I
CTE201		R	R	R			R
	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
EST111	Utilize commands and formats for using SolidWorks as a design tool.	R					
	Create 3 dimensional part models, assemblies and drawings.	R	R	R		R	
	Discuss the uses of SolidWorks in the fields of design, manufacturing and engineering.	R	R	R			
	Complete a project which reflects a real-world application.	R	R	R		R	
	Successfully work within teams to create drawings.	R	R	R		R	R
EST112	Demonstrate an understanding for 3D solid modeling	M	M	M			
	Demonstrate an understanding of layout concepts for 3D plans	M	M	M			
	Discuss the uses of SolidWorks in the field of Design, Manufacturing, and Engineering	M	M	M			
	Create complex 3D Solidworks designs and drawings that reflect a real world applications	M	M	M			
	Complete a project which reflects a real-world application.	M	M	M			
	Successfully work within teams to create drawings.	M	M	M		M	M

	Create basic designs and 3D printed prototypes given specifications and potential customer wants and needs.	M	M	M	M	M	M
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 m	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