Course Acronym:	ETEC
Course Number:	14
Descriptive Title:	Electronics for Engineering Technologists
Division:	Industry and Technology
Department:	Engineering Technology
Course Disciplines:	Electronics, Engineering Technology
Catalog Description:	In this course, students are introduced to the application of electronics in engineering technology. The topics studied include safety, Ohm's Law, engineering notation, Direct Current (DC) circuits, capacitance, inductance, reactance, impedance, analog and digital waveforms, basic motors, number systems, logic gates, Boolean algebra, flip flops, shift registers and microprocessors. Techniques in computer simulation and electrical measurements will be stressed.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	4
Outside Study Hours:	4
Total Course Hours:	108
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	1/23/2006
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	

Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Logic Equivalencies** Students will be able to use NAND and NOR Gates to configure and test logic equivalencies of: NOT, AND, OR, Exclusive OR and Exclusive NOR logic functions. **SLO #2 Logic Circuit** Using discrete TTL or CMOS Logic Gates to design, construct, and demonstrate a logic circuit which displays the students Birth Date using three toggle switches, various logic gates, and a single seven segment common anode LED display. **SLO #3 Karnaugh Map** Given a 4 bit (16 items) binary truth table, generate a Karnaugh Map to find a simplified solution. **SLO #4 Base 10 Conversion** Given a negative two's complement binary number, convert this to a base 10 number.
Course Objectives:	1. Distinguish the causes and dangers of electrical shock and methods of prevention. 2. Describe the sequences in building and analyzing a simple circuit. 3. Explain how Ohm's Law is used in analyzing an electrical circuit. 4. Analyze circuits using Circuit Simulation Software. 5. Explain the difference between Electromotive Force (EMF) and Counter Electromotive Force (CEMF). 6. Connect meters to a circuit and obtain accurate measurements. 7. Use an oscilloscope to measure waveform time and voltage. 8. Recognize electronic schematic symbols and determine use. 9. Recognize the relationship between the Boolean expression, logic diagram and truth table. 10. Describe binary addition and subtraction by designing circuits to produce correct answers.

	11. Evaluate the use of shift registers in product design and the speed at which those products run. 12. Formulate flow charts to correctly apply simple programming concepts of microprocessors.
Major Topics:	**I. Overview of Electronics for Engineering (2 hours, Lecture)** A. Material instructions B. Safety instructions **II. Safety Lab (4 hours, Lab)** A. Electrical shock B. Component handling **III. Schematic Symbols (4 hours, Lecture)** A. Recognizing symbols B. Circuit simulation software **IV. Schematic Symbols (8 hours, Lab)** A. Schematics exercise B. Symbols exercise **V. Electrical Quantities (4 hours, Lecture)** A. Resistors and color code B. Ohm's Law C. Engineering notations D. Power ratings **VI. Electrical Quantities (8 hours, Lab)** A. Resistor exercise B. Ohm's Law exercise **VII. Electrical Measurements for DC Circuits (4 hours, Lecture)** A. Series circuits, parallel circuits B. Compound circuits **VIII. Electrical Measurements for DC Circuits (8 hours, Lab)** A. Series circuits exercise B. Parallel circuits exercise **IX. Alternating Current (AC) Waveforms (4 hours, Lecture)** A. Using signal, pulse and function generators

	B. Using the oscilloscope **X. AC Waveforms (8 hours, Lab)** A. Function generators exercise B. Oscilloscope exercise **XI. RC and RL Time Constants (4 hours, Lecture)** A. RC and RL reactance B. RC and RL RCL series impedance C. Resonance D. Motors **XII. RC and RL Time Constants (8 hours, Lab)** A. RC and RL reactance exercise B. RC and RL RCL series impedance exercise **XIII. Solid-State Devices (4 hours, Lecture)** A. Diodes B. Transistors C. Amplifiers D. Integrated analog circuits **XIV. Solid-State Devices (8 hours, Lab)** A. Diodes exercise B. Transistor exercise **XV. Digital Electronics (10 hours, Lecture)** A. Number systems B. Logic gates C. Boolean algebra D. Flip-flops E. Shift registers F. Microprocessors **XVI. Digital Electronics (20 hours, Lab)** A. Number system exercise B. Logic gate exercise
Total Lecture Hours:	36
Total Laboratory Hours:	72
Total Hours:	108

Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Given a group of fifty assorted resistors, test each resistor and determine if good or bad by matching measured values with limits of tolerance. Record on a one-page lab report the in tolerance and out of tolerance resistors. Submit lab report to the instructor.
Critical Thinking Assignment 1:	Use a standard laboratory frequency counter to compare the live frequency and the frequency output of a laboratory grade oscillator. Record the data on tabular form on a one-page lab report and submit to the instructor.
Critical Thinking Assignment 2:	Design a circuit to control a seven-segment display with a decimal to Binary Coded Decimal (BCD) decoder and a display driver. Simulate and verify the circuit operation. Consult the instructor for evaluation.
Other Evaluation Methods:	Class Performance Completion, Laboratory Reports Matching Items Multiple Choice| Other Exams Performance Exams Quizzes Term or Other Papers True/False Written Homework
Instructional Methods:	Demonstration Lecture Multimedia presentations
If other:	Computer simulations
Work Outside of Class:	Journal (done on a continuing basis throughout the semester) Problem solving activity Required reading Study
If Other:	
Up-To-Date Representative Textbooks:	Robert Diaz. The Digital Collection. 2020 ed. El Camino College. 2020.
Alternative Textbooks:	Project Lead the Way (PTLW) handouts Thomas Floyd, Digital Fundamentals, Eleventh Edition, Prentice Hall/Pearson, 2015 M. Morris Mano, Digital Design, Prentice Hall/Pearson, 5th edition, 2013
Required Supplementary Readings:	
Other Required Materials:	
Requisite:	
Category:	
Requisite course(s): List both prerequisites	

and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
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Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Steve Cocca and Eric Carlson
Date:	09/23/2015
Original Board Approval Date:	01/23/2006
Last Reviewed and/or Revised by:	Robert Diaz
Date:	10/19/2021
Last Board Approval Date:	