

MECH 0008 - INTRODUCTION TO ELECTRONICS

Catalog Description

Formerly known as CIE 8

Hours: 54 lecture

Description: General principles, concepts, terminology, and applications of electronics in the context of mechatronics technology. (CSU)

Course Student Learning Outcomes

- CSLO #1: Analyze the relationship between electric current, voltage, resistance, and power.
- CSLO #2: Analyze functional electronic circuits from schematic diagrams.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

Through objective examination, calculation and written responses, students will:

1. Access the function of electronic devices, circuits, and systems;
2. Analyze and calculate the electrical quantities of simple and complex circuits;
3. Distinguish the symbols and nomenclature used in electronics;
4. Correlate the principles of magnetism and electro-magnetism in relation to AC;
5. Analyze the behavior of reactive components and their applications in circuits;
6. Analyze the behavior of semiconductor devices in both discrete devices and integrated circuits;
7. Analyze the fundamental principles of electronic communication;
8. Compare the differences between analog and digital electronic devices and their applications to computers;
9. Analyze the application of microcontrollers in embedded systems;
10. Analyze the application of electronics in mechatronics systems.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)

- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Objective Examinations
 - Example: Students will be given a test on Cells and Batteries. Standard Grading. Sample question: A cell that can be recharged is referred to as a (n) _____ type?
- Problem Solving Examinations
 - Example: Students will work in groups to solve the following: Calculate the power consumption of a 110 volt heater operating at 10 amperes of current.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. Instructor will discuss the principles of electrical power dissipation. A demonstration will be presented by connecting a low power resistor to a high voltage source. The resistor will quickly overheat and burst into flames. Students will build a simple circuit with a voltage source and a load and will feel the load get warm due to Ohmic heating. The follow-up to the demonstration is a discussion on the use of Watt's law and its impact on the presentation.
2. Instructor will discuss the basic elements of an electro-chemical cell. A brief history of the discoveries by Galvani and Volta will be given. Examples of common primary and secondary will be presented. A demonstration will be presented using a strip of copper, a strip of zinc, and brewed coffee. Students will then build two simple cells from copper and zinc strips, measure the voltage generated, then connect them in series, predict their combined voltage, then verify by measurement. The follow-up to the demonstration is a discussion comparing various battery chemistry in use today.

Distance Learning

1. Instructor will use a synchronous or asynchronous video to demonstrate an online circuit simulator. Students will use an online circuit simulator to build a virtual circuit that demonstrates series and parallel circuit analysis. Instructions will be posted on LMS and students will post results on LMS. Students will see real-time results of various circuit branches and the instructor will provide clarification and areas for improvement on the student's submitted assignment

Typical Out of Class Assignments Reading Assignments

1. Read the chapter on Ohm's law and Watt's law for an understanding of the basic relationships between voltage, current, resistance, and power. Students should prepare to discuss the topic during the next class session.
2. Read the supplemental handout on the "War of the Currents" to understand why alternating current was selected for electrical power

distribution. Students should prepare to discuss the topic during the next class session.

Writing, Problem Solving or Performance

1. Complete the quiz on batteries and cells. 2. Solve through calculation the circuit problems using Ohm's and Watt's law formulas.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Electricity and Basic Electronics
 - Author: Stephen R. Matt
 - Publisher: Goodheart-Willcox
 - Publication Date: 2013
 - Text Edition: 8th
 - Classic Textbook?:
 - OER Link:
 - OER:
- Electronics for Beginners: A Practical Introduction to Schematics, Circuits, and Microcontrollers
 - Author: Bartlett, Jonathan
 - Publisher: Apress
 - Publication Date: 2020
 - Text Edition: 1st
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.