ESYST 101 - Basic Electronics

Approval Date: Effective Term:

Department: ELECTRONIC SYSTEMS TECHNOLOGY
Division: Career Technical Education
Units: 4.00
Grading Option: Letter Grade
Transferability: CSU Transferable
Course is: AA/AS Degree
Repeatability:

Contact Hours per Term:
Lecture/Discussion: 3.00
Lab: 3.00

Associate Degree GE Applicability: No
Recommended Class Size: 35

Discipline/Minimum Qualifications:
Electronics

Catalog Description:
Introduces basic electronics and electronic systems technology.

Schedule Description:
Introduces basic electronics and electronic systems technology.

Student Learning Outcome:
Lecture:

1. Analyze simple circuits in terms of current, voltage, power, resistance, and efficiency.

Lab:

1. Construct a basic DC circuit using the proper wire, components, and power settings to achieve a predetermined outcome.

Course Objectives:
Lecture:

1. Examine career opportunities in the electronics industry.
2. Appraise systems as applied to electronics.
3. Explain the operation of the main building blocks and circuits of electronic systems.
4. Differentiate conductor, insulator and semiconductor materials.
5. Compare and contrast the most common types of wire and cable, and state where each is used.
6. Interpret Kirchoff's Laws as they apply to electronic systems.
7. Calculate the resistance in a basic DC circuit given voltage and amperage using Ohm's law.
8. Explain the basic use of multimeters, power supplies, function generators, and oscilloscopes.
9. Assess basic methods and procedures for troubleshooting.

Lab:
1. Construct a simple DC circuit on a breadboard.
2. Measure resistance, current, and voltage on basic DC and AC circuits.
3. Perform troubleshooting on basic DC and AC circuits.

Course Content Outline:
1. Introduction to the Electronics Industry and Careers
   1. Segments of the Electronics Industry
   2. How the Industry Works
   3. Jobs and Careers
2. Introduction to Systems
   1. Systems Defined
   2. Elements of a System
   3. System Examples
3. Test Equipment
   1. Operation and Use of the Oscilloscope
   2. Operation and Use of the Function Generator
   3. Operation and Use of the Multimeter
   4. Operation and Use of the Power Supply
4. Electrical and Electronic Measurement Principles
   1. Atomic Structure
   2. Accuracy
   3. Precision
   4. Error
   5. Standards
5. Introduction to Electricity
   1. Atomic Structure
   2. Electrical Charge
   3. Current
   4. Voltage
      1. AC
      2. DC
   5. Resistance
   6. Insulators
   7. Conductors
   8. Electrical Circuits
9. Kirchoff’s Laws
10. Basic Circuit Measurements

6. Ohm’s Law
   1. Ohm’s Law
   2. Current Calculations
   3. Voltage Calculations
   4. Resistance Calculations
   5. Current, Voltage, Resistance Relations

7. Power and Energy
   1. Power and Energy
   2. Power in Electric Circuits
   3. Resistor Power Ratings
   4. Energy Loss and Voltage Drop in Resistance

8. Resistors, Capacitors, & Inductors
   1. Resistors
   2. Capacitors
   3. Inductors

9. Circuits
   1. Voltage and Current Sources
   2. Thevenin’s Theorem
   3. Maximum Power Theorem
   4. Series
   5. Parallel

10. Introduction to Semiconductors and Basic Systems
    1. Semiconductors Defined
    2. Diodes and How They Work
    3. Rectifiers
    4. Introduction to Transistors and ICs
    5. The Basic Power Supply as a System

11. Wire and Cable
    1. Types and Sizes of Wire
    2. Types of Cable
    3. Cable Characteristics
    4. Introduction to Transmission Lines

12. Troubleshooting
    1. An Approach to Troubleshooting
    2. Troubleshooting Methods for DC/AC Circuits
    3. General testing procedures.
    4. Overview of test instrument options.
    5. DC troubleshooting.
    7. Physical repair, soldering/desoldering, IC handling

Lab:

1. Setting up and cabling a power supply.
2. Setting up and cabling a function generator.
3. Measurements using a multimeter.
5. Instruments and techniques for measuring and troubleshooting basic DC circuits.

Methods of Instruction:
Lab, Lecture:

Methods of Evaluation:
Exams/Tests/Quizzes
Problem Solving
Skill Demonstrations
Exams

Typical Assignments:

**Reading:**
Technical specifications for electronic components Schematics for electronic circuits Text Readings

**Writing, Problem Solving or Performance:**
Design a simple circuit in a software simulator Construct a simple circuit on a breadboard

**Other:**

Required Materials Examples:

**Book 1**
Author: Thomas L. Floyd 
Publication Date: 2009 
Edition: 8th
Title: Electric Circuits Fundamentals 
Publisher: Prentice Hall

**Book 2**
Author: Gene McWhorter, Alvis J. Evans 
Publication Date: 2000 
Edition: 2nd
Title: Basic Electronics 
Publisher: Master Publishing

Course Preparation:
Prerequisite(s): None
Co-Requisite(s): None
Recommended: None