Miami Dade College

Course Description

EET1033C | Electrical Fundamentals | 4.00 credits

This course is designed for students obtaining a CCC or AS degree in Engineering Technology, and related disciplines. The student will learn the basic concepts of electronics principles including Direct Current, Alternating Current, Series and Parallel circuits topologies, Basic electronics components, electronics measure tools and software simulation tools.

Course Competencies

Competency 1: The student will demonstrate an understanding of the basic concepts of electricity by:

1. Describing electricity in simple terms from the atomic to the conventional level
2. Defining basic units of electricity: volts, amperes, watts, and Ohms
3. Describing the elements of a circuit, i.e., conductors, insulators, and capacitors and how they function in a circuit
4. Build a circuit that contains voltage and resistance as a load

Competency 2: The student will demonstrate an understanding of Direct Current circuits by:

1. Describing Direct Current (DC) source and compare it Alternating current
2. Adding DC sources in series configurations
3. Applying Ohm's law to a basic DC circuit containing Voltage Source and a single resistor
4. Applying the concept of power, calculate power dissipated and or delivered by an electronic component
5. Applying the concept of power efficiency to a resistive circuit

Competency 3: The student will demonstrate an understanding on how to use standard measuring devices by:

1. Comparing the operation of analog (VOM) and digital (DMM) meters
2. Using the digital multimeter (DMM) to measure resistance, voltage and current
3. Using a digital volt meter (DVM) to measure voltage and currents
4. Using the oscilloscope to observe and measure ac and dc voltages
5. Observing and measuring flow patterns using the oscilloscope
6. Interpreting different waveform patterns using the Oscilloscope

Competency 4: The student will demonstrate an understanding of resistive circuit configurations by:

1. Differentiating between Series and Parallel circuits
2. Analyzing series resistive circuit and calculating voltages, current, and power in every element of the circuit
3. Analyzing parallel resistive circuit and calculating voltages, current, and power in every element of the circuit
4. Applying the concept of Voltage divider in series circuit
5. Applying the concept of Current divider in parallel circuit

Competency 5: The student will analyze a basic resistive Series- Parallel circuit combination by:

1. Calculating the total resistance in series-parallel circuit
2. Calculating power dissipation and delivered series-parallel circuit
3. Analyzing the concept of "Loading" using series-power circuit analysis

Competency 6: The student will demonstrate an understanding of Magnetism as it is applied to electronics by:

1. Describing magnetic force
2. Identify the poles of a magnet and state the relationship between them
3. Listing and defining the common units of magnetism such as magnetic fields, magnetic flux, and flux density

4. Describing the relationship between current and resulting magnetic field

Competency 7: The student will demonstrate an understanding of Inductors and Capacitor components by:

1. Describing the unit of inductance
2. Calculating the total inductance in series configuration
3. Calculating the total inductance in a parallel configuration
4. Describing the unit of capacitance
5. Calculating the total inductance in series configuration
6. Calculating the total inductance in a parallel configuration

Competency 8: The student will demonstrate an understanding of the concepts of Attenuation and amplification by:

1. Describing the terms Attenuation and amplification
2. Represent voltages and Power in Decibel (dB) form
3. Calculating power in decibel given power in Watts
4. Calculating voltage Decibel given voltage in Volts
5. Calculating cascading amplifiers power gain in Power and Decibels
6. Calculating cascading amplifiers voltage gain in Decibels

Competency 9: The student will demonstrate knowledge of basic fundamentals of Semiconductors material by:

1. Describing the Atomic structure of semiconductor material
2. Comparing and contrasting n-type vs p-type materials
3. Differentiating between Silicon and Germanium material to make up the p-n junction
4. Explaining the p-n junction mix and the make of Diode
5. Differentiating between Ideal diode and practical Diode
6. Analyzing Biased and unbiased diode configuration in a resistive Resistor-diode DC Circuit
7. Analyzing the Zenor diode in voltage regulation circuits

Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively