Miami Dade College

Course Description

EET1082| Introduction to Electronics | 3.00 credits

Learn by building practical electronic circuits. Survey course suitable for both majors and non-majors. Instructor and tutors available to assist in project completion. Topics include: schematics, pictorials, amplifiers, oscillators, burglar alarms, radios, digital circuits. Students will develop individual career plans and learn about employment opportunities within the field.

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, ampere, watt, Ohm
3. Describing the elements of a circuit, i.e., conductors, insulators, and capacitors and how they function in a circuit
4. Describing current, voltage, and resistance as it applies to a circuit
5. Discussing the similarities and differences between series and parallel circuits
6. Combining resistors in series and parallel in experimental circuits

Competency 2: The student will demonstrate an understanding on good laboratory practices by:

1. Practicing electrical safety in accordance with OSHA (?) standards
2. Using the most common SI prefixes to express these quantities in normal notation
3. Making proper electrical connections in breadboards
4. Making basic soldering connections

Competency 3: The student will demonstrate an understanding of the discreet components of electricity resistors, capacitors, and diodes by:

1. Defining the function and operation of resistors
2. Using the resistor color code to determine resistance
3. Stating the nominal value of resistance when given a resistor
4. Assembling circuits that include resistors
5. Defining the function and operation of a capacitor
6. Using capacitor labeling nomenclature to determine the value of a capacitor
7. Demonstrating how to charge and discharge capacitors
8. Combining capacitors in series and parallel and explaining the effect of each connection on total capacitance
9. Describing the operation of a diode and working experiments involving these
10. Describing the basic operation of the transistor and working experiments involving these

Competency 4: The student will demonstrate an understanding on basic proficiency in direct current circuits (DC) by:

1. Solving basic algebraic problems applied to DC circuits
2. Solving problems in electronics units utilizing metric prefixes
3. Relating electricity to the nature of matter
4. Identifying sources of electricity
5. Defining voltage, current resistance, power, and energy
6. Applying Ohm's law and power formulas to solve current voltage resistance and power
7. Reading and interpreting color codes and symbols to identify electrical components and values

Competency 5: The student will demonstrate an understanding of basic circuit analysis by:

1. Tracing current flow throughout a circuit
2. Describing series and parallel and how they affect voltage and current in a circuit
3. Building series and parallel circuits
4. Applying Ohm's law to find a single unknown voltage, current or resistance

Competency 6: 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. Measuring simple vs complex input and output voltages
5. Using the oscilloscope to observe and measure ac and dc voltages
6. Observing and measuring flow patterns using the oscilloscope
7. Interpreting different waveform patterns

Competency 7: The student will demonstrate an understanding on how to design, build, and assemble series and parallel circuits by:

1. Using a soldering iron to solder one simple circuit.
2. Building simple electronic devices including but not limited to a solid state switch, a solid state analog amplifier, am radio, light detector, burglar or other type of alarm, etc.
3. Constructing a simple op-amp circuit
4. Breadboarding an oscillator
5. Testing and explaining practical circuits such as voltage dividers and timing circuits
6. Breadboarding a simple transistor switch
7. Wiring and testing simple resistive circuits, and relate the results to Ohm's law
8. Wiring an RC circuit to show the rate of charge and/or discharge and relating this to the time constant

Competency 8: The student will demonstrate a basic understanding of digital circuits (DC) by:

1. Relating the uses of digital-to-analog and analog-to-digital conversions
2. Constructing digital-to-analog and analog-to-digital circuits
3. Troubleshooting digital-to-analog and analog-to-digital circuits
4. Identifying types of digital displays
5. Constructing digital display circuits
6. Troubleshooting digital display 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