National Center for Supply Chain Automation

MASTER SYLLABUS

AC/DC Electronics Circuits

Semester Credit Hours: 4.00

Prerequisites: None

## COURSE DESCRIPTION

AC/DC Electronics Circuits and applications. AC/DC Electronics focuses on the basic electricity principles of alternating current/direct current (AC/DC) circuits. This course presents an overview of the fundamentals of electric/electronic circuit analysis. Topics include basic electrical theory including Ohm’s Law, Kirchhoff’s Current Law (KCL) and Kirchhoff’s Voltage Law (KVL), which apply to Direct Current (DC) and Alternating Current (AC) circuits. It also covers series, parallel and complex series/parallel circuits, capacitors, inductors, and magnetics, with focus on analog and digital devices and their applications.

## STUDENT LEARNING OUTCOMES

Upon successful completion of the course, students should be able to perform the following:

* Define and demonstrate the fundamentals of Ohm’s Law;
* Define and demonstrate Kirchoff’s Current Law (KCL) and its applications;
* Define and demonstrate Kirchoff’s Voltage Law (KVL) and its applications;
* Identify the functions of capacitors, inductors and magnetics in the AC/DC electronics circuit;
* Design and build AC and DC electronic circuits according to the specifications;
* Solve for variables in basic, direct and alternating current and voltage in the series\parallel circuits;
* Identify and solve real-world problems through the application of electronics theory and concepts;
* Use techniques to solve for unknowns in complex series\parallel circuits;
* Measure and analyze the accuracy of data;
* Recognize and assess evidence from a variety of sources;
* Write with precision and clarity to express complex thought;
* Test and troubleshoot and AC and DC electronics circuits.

**COURSE OUTLINE**

* Introduction to Ohm’s Law
* Conductors, Insulators, Resistors
* AC-DC Series Circuits and applications
* AC-DC Parallel Circuits and applications
* Voltage and Current Dividers
* Kirchoff’s Laws
* Network Theorems
* Magnetism
* Capacitance and Capacitive Reactance
* Inductance and Inductive Reactance
* Filters using resister and capacitor (RC) or resister and inductor (RL) combinations
* Time Constants (T= RC) or (T= L/R)
* Electronic Devices