ITSC 110: ELECTRICAL THEORY ESSENTIALS

Foothill College Course Outline of Record

Heading	Value
Units:	1
Hours:	12 lecture, 14 laboratory per quarter (26 total per quarter)
Prerequisite:	Completion of recognized sound and communication apprenticeship or equivalent and recent employment as an installer/technician in the sound and communication industry.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Description

Covers the basics of electrical circuits, how electricity works, how to calculate and measure voltage, current, resistance and power in a series and/or parallel circuit.

Course Objectives

The student will be able to:
A. Describe the basic structure of the atom
B. Describe the relationship between the valence electrons and electron movement
C. Describe the units of measurement of current, voltage, resistance, and power
D. Demonstrate knowledge of the units ampere, volt, ohm, and watt by giving examples of their usage
E. Explain the electron theory of current flow versus conventional current flow
F. Solve electrical problems using Ohm's law
G. Describe circuit concepts of open, closed, and short circuits
H. Determine the current flow scenarios for open, closed, and short circuits
I. Name the components of the AC sine wave
J. Calculate the root mean square (RMS), peak amplitude, peak-to-peak values, period, frequency, and average values of AC
K. Define inductance
L. Define impedance
M. Define capacitance

Course Content

A. DC Theory (Lec)
1. Introduction
2. Elemental electricity
a. Voltage
b. Current
c. Resistance
d. Power
3. Circuit theory and switches
4. Ohm's law
5. Series circuit
6. Parallel circuit
B. DC Lab (Lab)
1. Series and parallel circuit lab
a. Meter use
b. Calculate and measure resistance
c. Calculate and measure voltage
d. Calculate and measure current
e. Calculate and measure power
C. AC Theory (Lec)
1. Introduction
2. Production of a sine wave
3. Inductors
4. Inductive reactance
5. Impedance
6. Capacitors
7. Capacitive reactance
D. AC Lab (Lab)
1. AC theory labs
a. Calculate and measure inductive reactance
b. Calculate and measure capacitive reactance

Lab Content

A. Work individually and in teams with basic tools of the trade, test instruments and tool safety.
B. Included will be the building and testing of electrical circuits using electrical theory trainers.
C. Equipment safety and safe handling practices are reviewed and applied.

Special Facilities and/or Equipment

A. Electrical theory trainer boards/components/digital multimeters.
B. When taught via Foothill Global Access, on-going access to email software and hardware; email address.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

A. Results of assessments
B. Results of quizzes and tests
C. Discussion participation

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

A. Lecture
B. Group discussion
C. Demonstration

Representative Text(s) and Other Materials

National Joint Apprenticeship and Training Committee (NJATC). DC Theory. 3rd ed. MD: NJATC Publishers, 2010.

National Joint Apprenticeship and Training Committee (NJATC). AC Theory. 3rd ed. MD: NJATC Publishers, 2011.

NOTE: These are the standard Sound & Communications textbooks/ workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course. We will adopt the next edition of each text, as it is published.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

A. Reading assignments:

1. Read DC Theory pp. 42-45: Electrical Properties of Materials

2. Read AC Theory pp. 29-33: AC Sine Wave Measurements regarding Peak-to-Peak, Root Mean Square, and Average Value

B. Writing assignments:

1. Explain in your own words how the number of electrons in the valence ring affects how materials conduct electricity. Provide examples

2. You will find that most equipment and voltage ratings are based using the Root Mean Square (RMS) values. Describe in your own words how RMS compares to a DC voltage and why it is typically used for voltage values

Discipline(s)

Telecommunication Technology