



MASTER COURSE OUTLINE

Prepared By: Bill Autry/Steve Matern

Date: April 2014

COURSE TITLE

Basic Electricity – AC Circuit Analysis

GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 106

(Formerly:)

CIP Code: 47.0302

Intent Code: 21

Program Code: 784

Credits: 5

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 33

Lab Hrs:44

Other Hrs:

Distribution Designation:

COURSE DESCRIPTION (as it will appear in the catalog)

Teaches alternating current theory, waveform quantities and characteristics, including network analysis with reactive components. Proper use of test equipment and troubleshooting simple circuits..

PREREQUISITES

IST 105 and MAP 103 or MAP 117, or Instructor Permission

TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty (Example: *ELECTRICITY Principles and Applications*, by Fowler).

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.

1. Safely perform DC and AC electrical circuit tests.
2. Solve basic electrical problems involving voltage, current, resistance, capacitance, and inductance..
3. Explain the relationship and differences between DC and AC electricity.
4. Use test equipment including multi-meters, & oscilloscope to measure voltage, current, resistance and capture waveforms for analysis.
5. Assemble, analyze, troubleshoot, and solve problems involving series, parallel, and series-parallel DC & AC circuits using test equipment.
6. Explain the concepts of 3-phase Alternating Current.

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

- 1) Review of circuit concepts
- 2) Sinusoid curve; Voltage & Current notation
 - a) Time, Frequency , & phase relationships
 - b) Mathematic & graphical concepts
- 3) Non-Sinusoidal waveforms
- 4) The Oscilloscope

- a) Displaying a waveform
 - b) Interpreting and quantifying waveforms
 - c) Phase differential
- 5) Power dissipation in purely resistive circuits.
- 6) Reactive components
- a) Capacitance
 - i) Energy storage in an electro-static field
 - ii) R/C time constant (Resistive-Capacitive)
 - iii) Analyzing & quantifying
 - b) Capacitive reactance
 - i) Voltage - Current relationships
 - ii) Series & parallel RC circuit analysis
 - c) Inductance
 - i) Energy storage in a Magnetic field
 - ii) L/R Time Constant (Inductive-Resistive)
 - iii) Analyzing & quantifying
 - d) Inductive reactance
- 7) Series & parallel RL circuits
- a) RLC circuits
 - b) Resonance considerations
- 8) Transformers
- 9) Principals of 3 Φ (3 phase) Alternating Current

DEPARTMENTAL GUIDELINES (*optional*)

DIVISION CHAIR APPROVAL

DATE