

Course discipline/number/title: ENGR 2213: Linear Circuit Analysis I

A. CATALOG DESCRIPTION

1. Credits: 4
2. Hours/Week: 3 Lecture, 2 Lab
3. Prerequisites (Course discipline/number): PHYS 1128, MATH 1128
4. Other requirements: None
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is a study of linear circuits, wherein techniques for the solution and ultimate understanding of electric circuits are studied. Topics include mesh analysis, nodal analysis, Thevenin's and Norton's methods for source transformations, equivalent circuits, natural and step response to RLC circuits, and sinusoidal steady state analysis with phasors. The accompanying integrated laboratory allows students to study, measure, and troubleshoot these circuits.

C. DATE LAST REVISED (Month, year): February, 2025

D. OUTLINE OF MAJOR CONTENT AREAS:

1. Circuit elements and variables
2. Simple resistive circuits
3. Techniques of circuit analysis
  - a) Node voltage method
  - b) Mesh current method
  - c) Source transformations
4. Operational amplifiers
5. Inductors and capacitors
6. Natural and step responses of RLC circuits
7. Sinusoidal steady-state analysis with phasors
8. Electronic measurement techniques
  - a) Multimeter
  - b) Oscilloscope
  - c) Function generator
9. Creation, analysis, and measurement of circuits
  - a) Sinusoidal RLC circuits
  - b) Step-response RLC circuits
  - c) Operational amplifier circuits
  - d) Diode and transformer circuits

E. LEARNING OUTCOMES (GENERAL): The student will be able to:

1. Analyze an electrical circuit for voltage and current responses when the circuit is stimulated by a forcing function.
2. Use the principle of power consumption to determine effects on electrical devices.
3. Analyze the time response to a step function when it is applied to an electrical circuit.
4. Analyze the AC response to a sinusoidal source when it is applied to an electrical circuit.

F. LEARNING OUTCOMES (MNTC): NA

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:

1. Objective exams
2. Lab exams
3. Quizzes
4. Written homework
5. Online homework
6. Small group projects
7. Oral presentations

- G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:  
Continued. . .  
8. Laboratory reports
- H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s):  
Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.
- I. SPECIAL INFORMATION (if any):  
1. Scientific calculator or equivalent is required.