

EE 205 – Fundamentals of Circuit Analysis – 4 Hours
Required course

1. *2007-2008 Catalog description*
Analysis of electric circuits. Transient and steady-state phenomena. General analysis techniques: loop and nodal equations, network theorems, and matrix methods. Co-requisites: MTH 223, PHY 201.
2. *Prerequisites by topics*
 - a. Differential and integral calculus.
 - b. Introductory matrix algebra.
 - c. Complex number algebra.
 - d. Quantitative problem solving at an introductory physics level.
3. *Textbook(s) and/or other required material*
Required: *Electric Circuits*, James Nilsson and Susan Riedel, Pearson Prentice Hall, Seventh Edition, 2007.
4. *Class Schedule*
Four sessions per week, each 50 minutes, for 14 weeks
5. *Topics Covered (Outcomes influenced)*
 - Basic concepts, circuit elements, Kirchhoff's Laws and applications (7 abc)
 - Techniques of circuit analysis: voltage division, current division, source transformation (7 abc)
 - Equivalent circuits: Thevenin's and Norton's equivalent circuits, phasor equivalent circuits (7 bcgh)
 - Natural and forced responses of RL and RC circuits with initial condition(7 def)
 - Natural and forced responses of RLC circuits with initial conditions (7 def)
 - Complex frequency and frequency responses of RLC circuits (7 ghij)
 - Phasor representation of signals and systems under sinusoidal excitation (7 abcdfghij)
 - Sinusoidal forced responses (7 abcdfghij)
 - AC power and effective values(7 dgh)
 - Power factor correction (7 dgh)
 - Mutual inductance and transformer(7 abcdhij)
 - Resonance (7 efhij)
 - Calculation of circuit responses using MATLAB
6. *Contribution of course to meeting the professional component*
Engineering science – 75%, Engineering design – 25%
7. *Course Outcomes (Program outcome contributions): In learning the course topics, the student will attain the following outcome*
 - a The student will write KCL and KVL equations for DC and AC circuits. (9 A, B, C, D)
 - b The student will apply mesh and nodal analyses and formulate the solution using matrix algebra. (9 A, B, D)
 - c The student will find simplified equivalent circuits for the circuits of interest. (9 A, B, D)
 - d The student will calculate power and energy delivery in the circuit. (9 A, B, C, D)
 - e The student will solve first- and second-order ordinary differential equations. (9 A, B, D)
 - f The student will analyze dynamic responses of the circuits to DC and AC inputs. (9 A, B, C, D)
 - g The student will use complex number representations and conversions. (9 A, B, D)
 - h The student will understand phasor representation of AC signals and circuit analysis. (9 A, B, D)
 - i The student will obtain frequency response of the circuit to sinusoidal excitation. (9 A, B, C, D)
 - j The student will apply time and frequency domain analysis techniques to circuit problems. (9 A, B, D)

8. *Grading policy*

The final grade will be determined by the combined numerical results of all exams, homework scores, and take-home exam problems including computer projects.

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Exam 4	100 points
Final Exam	150 points
Homeworks and computer projects	50 points

A grade of C corresponds to meeting the minimum competency required to understand course topics and meet course objectives.

9. *Relationship of course to program outcomes*

label	Program Outcomes (A Graduate from the program will:)	Contribution
A	demonstrate knowledge of the mathematical and scientific foundation of electrical engineering	Strong
B	demonstrate knowledge of and the ability to apply techniques and technology of electrical engineering	Strong
C	complete a design project sequence, culminating in a capstone project at or near the professional level	Foundational
D	demonstrate the ability to acquire new knowledge as needed for success in the electrical engineering profession	Moderate
E	meet Bradley's general education requirements which are based on the principles of liberal education	NA
F	have experience in communicating technical information and working on teams	Foundational
G	understand the importance of professional and ethical behavior	Moderate

10. *Prepared by:* In Soo Ahn *Date:* 5/21/2008