School of Management, Engineering and Technology
Department of Electrical Engineering and Renewable Energy

EE 223: Circuits II – AC and 2nd Order Transient Analysis

Catalogue Description (2009/2010):	AC and 2nd order transient analysis. Sinusoids and phasors. Sinusoidal steady-state analysis. Nodal analysis. Branch analysis. Source transformations. Thevenin´s and Norton´s equivalent circuits. Sinusoidal steady-state power calculation. Balanced three-phase circuits. Transformers. Student must register for a laboratory section.
Hours/Credits: (Lecture-Lab-Total)	(4-3-4)
Class Schedule:	Twice-weekly 75 minute lectures, one term
Lab Schedule:	Once weekly three hour labs, one term
Prerequisites:	EE 221, with a grade "C" or better, MATH 252
Required Text:	Nilsson, J.W., Riedel, S.A., "Electric Circuits," 8th Ed., Prentice Hall, ISBN: 0-13-198925-1
Reference Text:	"Fundamentals of Engineering Supplied-Reference Handbook," National Council of Examiners for Engineering and Surveying (NCEES), 8th Ed., 2008
Course Coordinator:	Robert Bass, Ph.D.
Regular Instructors:	Robert Bass, Cristina Crespo, Bruce Barnes, James Zipay, Claudia Torres-Garibay
Course Objectives - Lecture:	Upon completion of the lecture, a student should be able to: • design and analyze 2nd-order transient circuits. • design and analyze steady-state AC circuits using phasors. • apply various circuit theorems to analyze steady-state AC circuits. • design and analyze balanced three-phase circuits and perform power calculations. • design and analyze magnetic circuits, especially as they apply to inductors and transformers.
Course Objectives - Lab:	Upon completion of the lab, students should be able to: • appreciate safety & grounding considerations of high voltage circuits • analyze, design and simulate 2nd-order transient circuits • apply the concept of phasors in analyzing steady-state AC circuits • verify through experimentation the principles of magnetic circuits • verify through experimentation the operation of transformers • verify through experimentation the principles of balanced three-phase circuits • understand the concepts of instantaneous, RMS, real, reactive and apparent power • use spice to simulate single-phase and three-phase AC circuits • understand and be able to use power supplies, watt meters, multimeters in both single- and three-phase systems • understand basic NEC residential wiring guidelines and codes
Topics Covered:	• Transient Analysis • Sinusoidal Steady-State Analysis: Sinusoids and Phasors • Sinusoidal Steady-State Analysis: Techniques of Circuit Analysis • Sinusoidal Steady-State Analysis: Circuit Theorems • Sinusoidal Steady-State Analysis Power Calculations • Balanced Three-Phase Circuits
Relevant Program Outcomes:	(a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (d) an ability to function on multi-disciplinary teams (e) an ability to identify, formulate, and solve engineering problems

	(g) an ability to communicate effectively (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		
Required or Elective:	Required		
Criterion 5:	Engineering Topics		
Prepared By:	Robert Bass, Ph.D.	Updated:	April 26, 2010