

ECE 222 – ELECTRIC CIRCUIT ANALYSIS II

Type (check one): Required: X Elective: _____

2005-2006 Catalog Data: EE 222: Electric Circuit Analysis II. (Formerly EE 321 or EE 222) Complex frequency; damped sinusoidal forcing function, $Z(s)$ and $Y(s)$. Frequency response; series and parallel resonance. Magnetically coupled circuits; mutual inductance, linear and ideal transformers. Two-port networks; admittance, impedance and hybrid parameters. Fourier analysis; trigonometric and complex forms, complete response to periodic forcing functions. Fourier transforms; unit impulse function, convolution and circuit response in the time and frequency domain; system transfer functions. Laplace transform techniques, initial and final value theorems and transfer functions. Prerequisites ECE 221 and Math 231. Offered in the Fall and Spring semesters. *One semester; three credits.*

Prerequisites: ECE 221 and Math 231

Co-Requisites: None

Textbook: Irwin, J. D., Nelms, R. M. (2005) *Basic Engineering Circuit Analysis*, (8th Edition), Hoboken, NJ: Wiley.

Other Required Materials: None

Other References: Hayt, W. H., Jr., Kemmerly, J. E., and Durbin, S. M., (2002). *Engineering Circuit Analysis* (6th Edition), McGraw-Hill: New York, NY.
ISBN: 0-07-228364-5

Instructor: John Ventura, ECE Department

Course Objectives:

1. Basic competence in analyzing multiphase systems, magnetically coupled circuits, and two-port networks
2. Facility in determining and interpreting frequency response of general electric circuits using Fourier and Laplace transform techniques
3. Use of fundamental electric circuits concepts
4. Use of software such as PSPICE and MatLab[®] to supplement more traditional methods of problem solving

Prerequisites by Topics:

1. Basic circuit elements, resistors, capacitors, inductors, and independent and dependent sources.
2. Basic circuit analysis techniques for DC, steady-state AC, and transient cases.
3. Sinusoidal and other periodic functions.

Topics:

1. Multi-phase circuits
2. Magnetically coupled circuits
3. Circuit analysis with PSPICE and MatLab[®]
4. Complex frequency and Laplace transform
5. Analysis in the s-Domain
6. Frequency response
7. Two-port networks
8. Fourier analysis of circuits

Class Schedule: Three 50-minute sessions (Monday, Wednesday, Friday)

Prepared by: John Ventura **Date:** October 2005

Professional Component:
ECE 222 – ELECTRIC CIRCUIT ANALYSIS II

Category (check one)	<input type="checkbox"/> Math/Basic Science <input checked="" type="checkbox"/> Engineering <input type="checkbox"/> General Education <input type="checkbox"/> Other
Design (check one)	<input type="checkbox"/> Significant <input type="checkbox"/> Some <input checked="" type="checkbox"/> None
Realistic Constraints (check all that apply)	<input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input type="checkbox"/> Sustainability <input type="checkbox"/> Manufacturability <input type="checkbox"/> Ethical <input checked="" type="checkbox"/> Health & Safety <input type="checkbox"/> Social <input type="checkbox"/> Political

Relationship to Program Outcomes:

Check all that apply:

- (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
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice