ECE 221 – ELECTRIC CIRCUITS ANALYSIS I

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

2005-2006 Catalog Data: ECE 221. ELECTRIC Circuit Analysis I. (Formerly EE 221) Fundamental electrical concepts: charge, voltage, current, power, resistance, capacitance and inductance. Techniques of circuit analysis; Kirchhoff's Laws; nodal and mesh analysis; source transformations. Thevenin's and Norton's theorems; linearity and superposition. Transient analysis; source free R-L, R-C, and R-L-C networks; unit step forcing function; natural and forced responses. Sinusoidal steady-state analysis; the complex forcing function; phasors-complex impedance; complex power; effective values and balanced three-phase systems. Prerequisite: MATH 132. Co-requisites: PHYS 251. Offered in the Fall and Spring. One semester; three credits

Prerequisites: MATH 132
Co-Requisites: PHYS 251

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

Other Required Materials: None
Other References: None

Instructor: John Ventura

Course Objectives: This course is designed to give students a solid basis in electrical circuit theory. The student acquires the ability to apply knowledge of mathematics and science to electric circuit problems.

Prerequisites by Topics:

1. Polar coordinates and exponential functions
2. Integration and differentiation of simple functions
3. Charges, electric fields, magnetic fields, and energy concepts

Topics

1. Fundamental electrical concepts
2. Charge, voltage, current power
3. Resistance, capacitance, and inductance
4. Techniques of circuit analysis
5. Kirchhoff's Laws
6. Nodal and mesh analysis
7. Source transformations
8. Thevenin's and Norton's theorems, linearity, and superposition
9. Transient analysis
10. Source free R-L, R-C, and R-L-C networks
11. Unit step forcing function, natural and forced responses
12. Sinusoidal steady-state analysis
13. Phasors-complex impedence
14. Complex power
15. Balanced three-phase systems

Class Schedule: Three 50-minute sessions per week

Prepared by: John Ventura **Date:** October 19, 2005

Professional Component:
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Category (check one)	____ Math/Basic Science __X__ Engineering ____ General Education ____ Other
Design (check one)	____ Significant ____ Some __X__ None
Realistic Constraints (check all that apply)	____ Economic ____ Environmental ____ Sustainability ____ Manufacturability ____ Ethical ____ Health & Safety ____ Social ____ Political

Relationship to Program Outcomes:

Check all that apply:

__X__ (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
__X__ (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
__X__ (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice