EE-2112
Electric Circuits II and Lab

Catalog Designation: EE: required  CpE: required

Catalog Description:
EE 2112 - Electric Circuits II and Lab This course will cover second order transient circuits, AC steady-state power analysis, poly-phase circuits power analysis, magnetically coupled networks, variable frequency network performance, and two port networks.
Credits: 4.0 Lec-Rec-Lab: (3-0-1)
Semesters Offered: Fall Spring Summer Pre-requisites: E 2111 and (MA 3520 or MA 3521 or MA 3530 or MA 3560)

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
1. Familiarity in dc circuit analysis by node and mesh methods.
2. Familiarity with network theorems including superposition and Thevenin's equivalents.
3. Familiarity with complex numbers and complex number arithmetic.
4. Familiarity in ac circuit analysis using phasors.
5. Familiarity in operational amplifiers.
6. Familiarity in solving 1st order differential equations with constant coefficients.

Course Objectives:
1. Introduction to the transient response of second-order series and parallel R-L-C circuits from the characteristic equation.
2. Introduction to ac single frequency steady-state power.
3. Introduction to polyphase circuits and steady-state power analysis.
4. Introduction to the magnetically coupled networks.
5. Introduction to the variable frequency response, filter networks, Bode plots.
6. Introduction to resonance in series and parallel R-L-C circuits.
7. Introduction the use of the Laplace transform for circuit analysis.

Topics Covered:
1. First and Second Order Transient Circuits: First and Second Order Response
2. Steady-State Power Analysis: Complex Power, Power Factor and pf correction.
3. Magnetically Coupled Networks - Mutual Inductance, Energy Analysis, Ideal Transformer

5. Two Port Networks - Admittance/Impedance/Hybrid/Transmission Parameters, Conversions


**Relationship of the Course Content to Program Outcomes:**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Topics and Level of Coverage</th>
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<tbody>
<tr>
<td>a</td>
<td>an ability to apply knowledge of mathematics, science and engineering</td>
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<tr>
<td>b</td>
<td>an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<tr>
<td>c</td>
<td>an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability and sustainability</td>
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<tr>
<td>d</td>
<td>an ability to function on multi-disciplinary teams</td>
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<tr>
<td>e</td>
<td>an ability to identify, formulate and solve engineering problems</td>
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<td>f</td>
<td>an understanding of professional and ethical responsibility</td>
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<td>g</td>
<td>an ability to communicate effectively</td>
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<tr>
<td>h</td>
<td>the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context</td>
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<tr>
<td>i</td>
<td>a recognition of the need for, and an ability to engage in life-long learning</td>
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<td>j</td>
<td>a knowledge of contemporary issues</td>
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<tr>
<td>k</td>
<td>the ability to use the techniques, skills, and modern engineering tools necessary for the practice of electrical engineering</td>
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**Contribution of Course to Meeting Degree Requirements:**

4 Credit Hours – Engineering Topics

**Class/Laboratory Schedule** (note: 1 hour = 50 minutes):
Lecture: 42 hours = 3 hours/week for 14 weeks

**Prepared by:**
Trever Hassell, Academic Advisor/Instructor, Dec 1, 2016