EE - 4226
Power Engineering Laboratory

Curricular Designation: EE: elective     CpE: elective

Catalog Description:
EE 4226–Power Engineering Laboratory A laboratory course highlighting single phase and three phase power concepts, including power factor, single and three phase transformer configurations, non-ideal transformers, synchronous machines, renewable energy, power flow and fault simulations, relay settings and relay testing and calibration. 
Credits: 1.0 Lec-Rec-Lab: (0-0-3) Semesters Offered: Spring, Summer
Co/Pre-requisites: EE 4222

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
1. Familiarity with single and three phase power principles.
2. Familiarity with single and three phase transformer configurations.
3. Familiarity with rotating AC machines.
4. Familiarity with power system analysis and computational methods.
5. Familiarity with power system protection.

Course Objectives:
1. To provide a practical application of the knowledge acquired in the Energy Systems and Power Systems courses.

Topics Covered:
1. Laboratory Practices, Basic Measurements, and Safety
2. Renewable Energy Characteristics
3. Ideal Single Phase Transformers
4. Non-Ideal Transformers
5. Three Phase Circuits
6. Three Phase Transformers
7. PowerWorld Simulations
8. Synchronous Machines
9. Power System Protection
### Relationship of the Course Content to Program Outcomes:

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Important</th>
<th>Moderately</th>
<th>Minimally</th>
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</thead>
<tbody>
<tr>
<td>a</td>
<td>an ability to apply knowledge of mathematics, science and engineering</td>
<td>x</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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<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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<td>d</td>
<td>an ability to function on multi-disciplinary teams</td>
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<td>x</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>x</td>
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<td>g</td>
<td>an ability to communicate effectively</td>
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<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>x</td>
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<td>j</td>
<td>a knowledge of contemporary issues</td>
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<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:

1 Credit Hours – Engineering Topics

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

**Prepared by:**
John Lukowski, Associate Professor, December 5, 2016