EE - 3120
Electric Energy Systems

Curricular Designation: EE: required  
CpE: elective

Catalog Description:
EE 3120 - Electric Energy Systems An overview of the generation and utilization of electrical energy. Covers three-phase circuits, transformers, photovoltaics, batteries, electromechanical energy conversion, and an overview of electric power systems, including economic issues. Credits: 3.0 Lec-Rec-Lab: (3-0-0) Semesters Offered: Fall, Spring, Summer
Pre-Requisite(s): EE 2110 or EE 3010

Textbooks(s) and/or Other Required Materials:

Press Prerequisites by Topic:
1. Familiarity with complex numbers and complex number arithmetic.
2. Familiarity in solving basic DC and AC circuits.

Course Objectives:
1. Understand the principles of electrical energy generation
2. Understand the strategies for electrical energy conversion
3. Analyze 3 phase circuits
4. Understand single phase and three phase transformer operation
5. Be successful in senior level electrical power systems courses

Topics Covered:
1. DC - AC Concepts Reviewed
2. Intro to Power Systems
3. Energy Resources
4. Power Plants
5. Environmental Impacts
6. Renewable Energy
7. Three-Phase systems
8. Magnetic Circuits

9. Ideal Single Phase Transformers

10.3 Phase Transformer

11. Non-Ideal Transformers

12. Electric Machine Fundamentals

### 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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<tr>
<td>an ability to apply knowledge of mathematics, science and engineering</td>
<td>x</td>
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<td>an ability to design and conduct experiments, as well as to analyze and interpret data</td>
<td>x</td>
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<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>an ability to function on multi-disciplinary teams</td>
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<td>an ability to identify, formulate and solve engineering problems</td>
<td>x</td>
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<td>an understanding of professional and ethical responsibility</td>
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<td>an ability to communicate effectively</td>
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<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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<td>a recognition of the need for, and an ability to engage in life-long learning</td>
<td>x</td>
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<td>a knowledge of contemporary issues</td>
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<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:

3 Credit Hours – Engineering Topics

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

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