EE - 4411  
Engineering Electromagnetics

Curricular Designation:  EE: elective  CpE: elective

Catalog Description:  
**EE 4411 – Engineering Electromagnetics** A mathematically rigorous study of dynamic electromagnetic fields beginning with Maxwell’s equations. Topics include scalar and vector potentials, waves and radiation.  
*Credits: 3.0 Lec-Rec-Lab (3-0-0)  Semesters Offered: Fall  Prequisites: EE3140*

Textbooks(s) and/or Other Required Materials:


Prerequisites by Topic:

1. Mastery of the characteristics of plane waves and application of boundary conditions.

2. Familiarity with solutions of Maxwell’s equations for plane waves and guided waves in various structures (stripline, rectangular and circular waveguides), scattering phenomena.

Course Objectives:

1. Time-varying and time-harmonic electromagnetic fields
2. Understand electromagnetic theorems and principles of their application.
3. Understand the effects of complex media on electric and magnetic fields.

Topics Covered:

1. Time-varying and time-harmonic electromagnetic fields
2. Electrical properties of matter
3. Wave Equation and its Solutions
4. Wave Propagation and Polarization
5. Vector Potentials, Solutions, and Equations
6. Rectangular Waveguides.
7. Circular Waveguides
8. Scattering
9. Green's function techniques
### Relationship of the Course Content to Program Outcomes:

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<tr>
<th>Outcome Description</th>
<th>Important</th>
<th>Moderately</th>
<th>Minimally</th>
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<td>a) an ability to apply knowledge of mathematics, science and engineering</td>
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<td>b) an ability to design and conduct experiments, as well as to analyze and interpret data</td>
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<td>c) 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) an ability to function on multi-disciplinary teams</td>
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<td>e) an ability to identify, formulate and solve engineering problems</td>
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<td>f) an understanding of professional and ethical responsibility</td>
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<td>g) an ability to communicate effectively</td>
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<td>h) 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>i) a recognition of the need for, and an ability to engage in life-long learning</td>
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<td>j) a knowledge of contemporary issues</td>
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<td>k) 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:
Durdu Guney, Associate Professor, January 14, 2016