

Department	Electrical and Computer Engineering
Course Number	EELE 334
Course Title	Electromagnetic Theory I
Total Credit Hours and Format	3 Credits. (3 Lec) F
Catalog Description	<p>PREREQUISITE: PHSX 222, M 273</p> <p>Basic electric and magnetic fields including transmission lines. The materials covered will include both static and dynamic fields, traveling waves, and transmission line concepts such as impedance, reflection coefficient, and transient response.</p>
Faculty Coordinator	Wataru Nakagawa
Course Designation	Required
Textbook	Fawwaz T. Ulaby, Eric Michielssen, and Umberto Ravaioli, Fundamentals of Applied Electromagnetics, 6th Ed. (Prentice Hall, 2010).
Course Learning Outcomes	<p>At the conclusion of EELE 334, students are expected to be able to:</p> <ol style="list-style-type: none"> 1) Represent fields in either the standard Cartesian, cylindrical, or spherical coordinate systems. 2) Understand the physical meaning as applied to fields of the gradient, divergence, and curl. 3) Understand the physical meaning of Coulomb's Law. 4) Be able to set up the expressions for the electric field of charge distributions and understand the source of electric fields is charge. 5) Understand the field concept of voltage and the importance of Laplace's equation. 6) Understand under what conditions Gauss' Law can be used to calculate electric fields. 7) Be able to apply the boundary conditions for electric and magnetic fields. 8) Understand the physical meaning of the Biot-Savart law.

	<p>9) Be able to set up the expressions for the magnetic field of charge distributions and understand the source of magnetic fields is moving charge or current.</p> <p>10) Understand under what conditions Ampere’s Law can be used to calculate magnetic fields.</p> <p>12) Be able to express Maxwell’s Equations in either integral or differential form.</p> <p>13) Understand Maxwell’s Equations for time varying fields.</p> <p>14) Understand plane wave propagation.</p> <p>15) Use the Smith Chart for impedance calculations and impedance matching.</p>
Program Outcomes	a, b, e, i
Topics Covered	<p>1) Fields and field operators.</p> <p>2) Transmission line effects and the Smith Chart</p> <p>3) Static electric fields.</p> <p>4) Static Magnetic fields.</p> <p>5) Time-varying fields and Maxwell’s Equations.</p> <p>5) Plane wave propagation</p> <p>6) Introduction to polarization</p>
Prepared by	Wataru Nakagawa (5/14/2015)