Department	Electrical and Computer Engineering
Course Number	**EE 334**
Course Title	Electromagnetic Theory I
Course Designation	Required
University Catalog Description	Semesters offered: F; Prerequisites: PHYS 212, M 273 -- Basic electric and magnetic fields including introduction to transmission lines. The material covered will include both static and dynamic fields, travelling waves, and transmission line concepts such as impedance, reflection coefficient, and transient response.
Faculty Coordinator	Dr. Todd Kaiser
Prerequisite by Topic	Physics (electricity and magnetism), vector algebra, multivariable calculus. Response of R-L-C circuits.
Textbook	Ulaby: Fundamentals of Applied Electromagnetics, 5^{th} Ed. Pearson-Prentice Hall, 2007
Course Objectives	To produce students who have a basic understanding of electromagnetic theory as applied to electrical and computer engineering.
Course Learning Outcomes	At the conclusion of EE 334, students are expected to be able to: 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 condition of the normal component of D and the tangential component of E. 8) Understand the physical meaning of the Biot-Savart law. 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. 10) Understand under what conditions Ampere's Law can be used to calculate magnetic fields. 11) Be able to apply the boundary condition of the normal component of B and the tangential component of H. 12) Be able to express Maxwell's Equations in either integral or differential form. 13) Be able to relate Maxwell's Equations to circuit applications
Topics Covered	1) Fields and field operators. 2) Static electric fields. 3) Magnetic fields. 4) Time-varying fields and Maxwell's Equations. 5) Transmission line effects 6) Transients on transmission lines
Class/Laboratory Schedule	EE 334 meets three times /week for 50 minutes
Professional Component (Criterion 5)	The importance of electromagnetic fields in electrical engineering practice is emphasized by demonstrating the relationship between field theory and fundamental circuit laws. Because of the need for faster devices and higher data rates, the implication of how the fundamentals of Electromagnetic Theory affect these moves of technology is discussed.

ECE Program Outcomes	EE 334 supports the following Electrical and Computer Engineering Program Outcomes: a. An ability to apply knowledge of mathematics, science, and engineering. e. An ability to identify, formulate, and solve engineering problems. i. A recognition of the need for, and an ability to engage in life-long learning. k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
Total Credit Hours	3
Prepared by	Todd Kaiser 5/2009