Physics 402 Electromagnetic Theory
Spring 2011 Instructor: Dr. Don Summers 915-7032
Lewis Hall 108 TTh 2:30-3:45 summers@phy.olemiss.edu
Office: Lewis Hall Room 109 Text: Introduction to Electrodynamics
Office Hours: WThF 4-5 Griffiths, 3rd edition

Date	Subject	Read These Chapters
25 Jan	Lorentz Force Law	5
27 Jan	Diagnostic Test	
1 Feb	Boundary Conditions	5
3 Feb	Dia- Para-, Ferromagnets. Torque. Atomic Orbits	6
8 Feb	Bound Currents, H field	6
10 Feb	Ampere's Law with matter, Permeability	6
15 Feb	Electromotive Force, Ohm's Law	7
17 Feb	Faradays's Law, Inductance, B Field Energy	7
22 Feb	Maxwell's Equations, Boundary Conditions	7
24 Feb	Continuity Equation and Poynting Vector	8
1 Mar	Maxwell's Stress Tensor, Conservation of p and L	8
3 Mar	FIRST MIDTERM EXAM	
8 Mar	Electromagnetic Waves in One Dimension	9
10 Mar	Boundary Conditions, Polarization	9
22 Mar	Vacuum/Matter Waves, Absorption/Dispersion, Wave Guides	9
24 Mar	Potential Formulation, Gauge Transformations	10
29 Mar	Retarded Potentials, Lefimenko's Equations	10
31 Mar	Lienard Wiechert Potentials, Moving Charge Fields	10
5 Apr	Dipole Radiation, Power Radiated by a Point Charge	11
7 Apr	Circular Motion and Radiation, Radiation Reaction	11
12 Apr	SECOND MIDTERM EXAM	
14 Apr	Lorentz Transformations between frames of reference	12
19 Apr	Time Dilation/Length Contraction, Relativistic Mechanics	12
21 Apr	Relativistic Momentum and Energy	12
26 Apr	Magnetism as a Relativistic Phenomena, Tensors	12
28 Apr	Research Papers	
3 May	Research Papers	
5 May	Research Papers	
10 May	COMPREHENSIVE FINAL EXAM, 4:00 PM, Tuesday	

Grading: Homework 25% Research Paper 15% Midterms 30% Final 30%

Learning Objectives: Learn how to generate magnetic fields from currents. Become proficient with Maxwell's equations. Propagate electromagnetic waves. Generate electromagnetic radiation. Calculate relativistic motion.

Reasonable accommodations for absences and for students with disabilities will be provided.

Research papers will be start from the following.

"Muon acceleration to 750-GeV in the Tevatron tunnel for a 1.5- TeV muon collider," http://arXiv.org/pdf/0707.0302

"6D muon ionization cooling with an inverse cyclotron," http://arXiv.org/pdf/physics/0510034