PHYSICS 505 Classical Electrodynamics
Fall 2002
MWF 10:30-11:25 P112

Instructor: William Weisberger         TA: Gang Wang
Office: MT6-112                      C-123
Hours: Mon., Wed. 3:00-4:00          Mon., Fri. 12:30-1:30
email: william.weisberger@sunysb.edu  gawang@ic.sunysb.edu
phone: 2-7974
fax: 2-7954

Examinations: Two midterm hour exams, three hour final exam.
Homework: Problem assignments approximately weekly to be graded.

SYLLABUS

1. Introduction to Maxwell Equations

2. Vector Analysis – Integral Theorems

3. Electrostatics
   (a) Coulomb’s Law & Basic Phenomenology
   (b) Potential Theory
   (c) Conductors – Equipotential Surfaces
   (d) Forces & Stress Tensor
   (e) Field Energy & Capacitance
   (f) Multipole Expansion of Finite Charge Distributions

4. Dielectrics
   (a) Macroscopic Equations & Boundary Conditions
   (b) Boundary Value Problems
   (c) Field Energy & Forces in Dielectrics
5. Magnetostatics & Steady State Current Flow
   (a) Biot - Savart Law
   (b) Lorentz Force Law
   (c) Forces Between Currents & Units
   (d) Magnetic Fields from Localized Current Distribution
   (e) Force & Torque on Localized Current Distribution
   (f) Macroscopic Magnetic Fields & Boundary Conditions

6. Quasi-stationary Phenomena - Magnetic Induction

7. Maxwell Equations
   (a) Energy & Momentum Conservation
   (b) Electromagnetic Waves
   (c) Interface between Two Dielectric Media
   (d) Propagations of Electromagnetic Waves in Conducting Medium
   (e) Reflection by Plane Metallic Surface
   (f) Skin Depth & Energy Loss in Conducting Walls

Addendum to Syllabus: If you have a physical, psychological, medical or learning disability that may impact on your ability to carry out assigned course work, I would encourage you to contact the staff in the Disabled Student Services office (DSS), Room 133 in Humanities, phone 632-6748. DSS will review your concerns and determine with you what accommodations are necessary and appropriate. All information and documentation concerning disability is kept confidential.