**John F. Donoghue**
**Department of Physics**
**University of Massachusetts**
**Amherst MA 01003**
**donoghue@physics.umass.edu**

# Physics 606 – Classical Electrodynamics

# Syllabus Fall 2006

**Textbook**: Jackson, Classical Electrodynamics, 3$^{rd}$ edition

**Homework:** The weekly homework assignment are crucial for the development of your understanding of the subject. The due date and time will be identified on the problem assignment page. Late homework will not be accepted. You are allowed to consult with each other in solving the problems, but the final write-up must be entirely your own work.

**Grading**: Homework 50%, Midterm exam 25%, Final exam 25%

**Office hours**: I maintain an open door policy, and am willing to help you anytime. I will be experimenting with Google Calendar as a way for you to know about times when I will not be in my office. Instructions to follow.

## Course content

### Electrostatics
-   the scalar potential
-   general green functions

### Boundary Value Problems
-   separation of variables
-   3-d problems

### Media
-   multipole expansion
-   polarizability

## Magnetostatics
- the vector potential
- solution of magnetic problems

## Maxwell electrodynamics
- the full theory
- electromagnetic waves

## Returning to the foundations
- gauge invariance
- relativity
- covariant notation
- Lagrangian formulation of E&M

## Radiation
- multipole expansion for radiation