

Physics 15-030-707
Electro- and Magnetostatics
Randy Johnson
Winter, '12

Required Text

J.D. Jackson, *Classical Electrodynamics*, 3rd Edition, Wiley and Sons, 1999.

Additional Texts

Graduate Level:

Landau & Lifshitz, *The Classical Theory of Fields*.
Landau & Lifshitz, *Electrodynamics of Continuous Media*.
Di Bartolo, *Classical Theory of Electromagnetism*.

Undergraduate Level:

Panofsky & Phillips, *Classical Electricity and Magnetism*.
Reitz, Milford, & Christy, *Foundations of Electromagnetic Theory*.
Pollack & Stump, *Electromagnetism*.

Course Web Page : <http://www.physics.uc.edu/~johnson/EM/index.html>

On web page, you will be able to find a detailed outline of the course, list of prework and homework problems with their due dates and their solutions, a list of previous exams, and the Mathematica examples used in the course.

Learning Objectives for the Course

- Manipulate the static versions of Maxwell's equations.
- Solve homogeneous boundary value problems in various coordinate systems for Laplace's equation.
- Use Green's functions to solve inhomogeneous boundary value problems for Poisson's equation.
- Learn *Mathematica*.

Grading

Prework/Homework	50% of grade
Midterm	17% of grade
Final	33% of grade

Prework and homework problems will be assigned daily in class and are due at the beginning of the next class (typically there will be one prework problem covering material for the next class and one homework problem covering material just covered in each class). **No late homeworks will be accepted.** Solutions will be posted on the web shortly after class on the due date.

Outline of course with approximate dates

Professor will be out of town many Wednesdays this quarter. Additional classes will be held in 407 Geology/Physics on Tuesdays at 4:30 starting 1/17.

1/4	Introduction
1/6 – 1/13	Introduction to Mathematica Professor will be out of town during this period. Patrick Malsom will teach class. Classes will be held in computer lab in 300 Geology/Physics.
1/16	No Class - Martin Luther King Day
1/17	First Tuesday afternoon class
1/17 – 1/20	Two Dimensional Laplace Equation – Complex Analysis

1/18	No Class – Professor is out of town (MicroBooNE Director’s Review)
1/23 – 1/27	Point Charges, Orthogonal Polynomials – Chapter 2.
1/25	No Class – Professor is out of town (DOE proposal reviews)
1/30 – 2/1	Finite Element Analysis – Chapter 1.12-13, 2.12
2/3 – 2/15	Chapter 3
2/6	Midterm covering Introduction, Chapters 1 and 2.
2/17 – 2/28	Chapter 4
2/29	No Class – Professor is out of town (MicroBooNE DOE Review)
3/2 – 3/11	Chapter 5
3/14	Final Exam – 8:00 – 10:00 AM.