
PHY6346

Electromagnetic Theory I

Fall 2019
MWF, period 8

3:00 p.m.-3:50 p.m.

NPB 1101

Instructor: Dmitri Maslov
E-Mail: maslov@phys.ufl.edu

Phone: (352) 392-0513

Office: NPB 2114

Office hours:

Wed 4:00 p.m.-5:00 p.m.

Thu 3:00 p.m.-4:00 p.m.

or by appointment

Grader: TBA

E-Mail:

Office:

Office hours:

All materials for this class will be posted at [UF e-learning](#) . Enter with your Gatorlink login and password.

Overview

PHY 6346 is the first semester of the graduate core sequence in Electromagnetism. The objectives of the course are

1. to study electrodynamics at a theoretically sophisticated level;
2. to develop mathematical techniques useful for solving problems in E&M as well as other areas of physics;
3. to develop problem solving skills;
4. to prepare the student (if necessary) for the preliminary exam.

Topics to be covered include

- Electrostatics: Coulomb's Law, the electric field, Gauss's Law, scalar potential, Poisson's equation, Green's functions
- Methods: images, separation of variables, harmonic functions
- Multipoles, polarization, displacement, linear dielectrics
- Magnetostatics: Biot-Savart Law, the magnetic field, Ampère's Law, vector potential, magnetization, magnetic materials
- Time-varying magnetic field: Faraday's Law, induction, Ohm's law, skin depth

Reading guide to Zangwill:

Chapter 1

Chapter 2

Chapter 3

Chapter 7

Chapter 8

Chapter 4

Chapter 5

Chapter 6

Chapter 9

Chapter 10

Chapter 11

Chapter 12

Chapter 13

Materials

- **Main text:**
A. Zangwill, Modern Electrodynamics, Cambridge.
- **Supplemental texts:**
J. D. Jackson, Classical Electrodynamics, 3rd ed.
L. D. Landau and E. M. Lifshitz, Electrodynamics of continuous media (Landau Course of Theoretical Physics, v.8).

Important dates

No classes:

Sept 2 (Labor Day)

Oct 4 (Homecoming)

Nov 11 (Veteran's Day)

Nov 27-29 (Thanksgiving)

Midterm I

Tue, Oct 22, time & room TBA

Final exam

Thu, Dec 12

5:30 p.m.-7:30 p.m.

Coursework

Weekly homework (50% of the grade), due every Friday before class

Midterm 1 (25%)

Midterm 2 (25%) (in lieu of final exam)

Units Rule:

Every algebraic solution of homework and exam problems must be accompanied by a unit check. Without such a check, no more than 75% of the credit will be given even for an otherwise perfectly correct solution. On the other hand, constructing an answer using dimensional analysis and other general arguments (symmetries, analysis of limiting cases, etc.) may earn you up to 50% of the credit, even if a complete solution is not provided.

University Policies

Students are expected to know and comply with the University's policies regarding academic honesty and use of copyrighted materials. Cheating, plagiarism, or other violations of the Academic Honesty Guidelines will not be tolerated and will be pursued through the University's adjudication procedures.

Students requesting classroom accommodations must first register with the Disabilities Resources Program, located in the Dean of Students Office, P202 Peabody Hall. The Disabilities Resources Program will provide documentation to the student, who must then deliver this documentation to the instructor when requesting accommodations.

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>