Recent Announcements

PHY4323 U01 1218

Intermediate Electromagnetism 1

Jorge Luis Rodriguez

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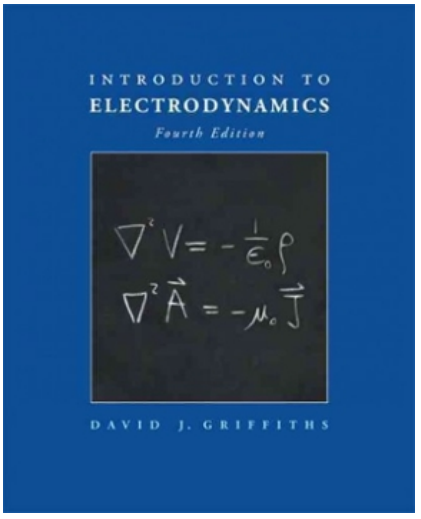
Office: CP 202

Hours: MW 3:15PM to 5:00PM



Class meets: CP 117

MW 2:00PM - 3:15PM

Course Description and Purpose

This is an intermediate course in electromagnetism. It is the first course in a two-term sequence designed for physics majors and/or those interested in exploring electromagnetic phenomena at a deeper level which is both more sophisticated and mathematically rigorous. Although the subject matter is the same as in an introductory course, we will be able to explore more realistic and interesting examples of electromagnetic phenomena. In the process, students will gain a deeper understanding of the concepts as well as learn many important and useful mathematical tools and techniques. Specifically, we will cover the theory of electromagnetic fields and waves which will be developed from basic principles. Vector algebra and calculus, Coulomb's law, Gauss's Law, electrostatic potentials, dielectrics, solutions to Laplace's and Poisson's equations, magnetic induction, vector potentials, magnetic materials, Maxwell's equations, and propagation of waves in space and through various media.

Course Prerequisites

The following math courses are required. Vector Calculus MAC2313 and Differential Equations MAP2302. Additionally, an introductory course in electromagnetism such as Physics with Calculus 2 or PHY2049 is required. In fact, it is highly recommended that you do attempt this course unless you have successfully completed these prerequisite courses. Also, recommended are additional courses in mathematical methods for physicists and classical mechanics such as Methods in Theoretical Physics PHZ 3113 and Introduction to Classical Mechanics PHY 4221.

Textbook

Required: "Introduction to Electrodynamics 4th Edition" by David J. Griffiths

Reference: "Electromagnetic Fields 2nd Edition", by Roald K. Wangsness
Reference (Graduate Level): "Classical Electrodynamics 3rd Edition", by John D. Jackson

Reference (Math Handbook): "Mathematical Handbook of Formulas and Tables 4th Edition", by Murry R. Spiegel, Seymour Lipschutz, John Lui **PDF**

List of textbooks in electromagnetism - Wikipedia (https://en.wikipedia.org/wiki/List_of_textbooks_in_electromagnetism#Undergraduate)

Course Objectives

Upon completing this course, students will be able to:

- have an excellent grasp of electromagnetic phenomena, including electrostatics, magnetostatics, electromagnetic properties of matter, time-dependent electromagnetic fields, Maxwell's equations, electromagnetic waves. the emission, scatter and absorption of radiation and the role played by special relativity in electromagnetic phenomena and mechanics.
- be able to apply these concepts in problem-solving beyond that learned at the introductory level. So the emphasis is placed on the use of vector calculus, partial and ordinary differential equations, line, surface, and volume integrals, solutions to boundary value problems all in the service of finding properties of electromagnetic field and potentials, both static and time-dependent.

Important Information

Before starting this course, please review the following pages:

- **Accessibility and Accommodation**
- **Grading Policy and Missing an Exam**
- **Academic Misconduct Statement**
- **Drops and Incompletes**
- **Covid-19 Information**

***The professor reserves the right to change or modify the syllabus at any time in any way during the semester.**

Grading Scheme

Grading Scheme for the course

Letter	Range%	Letter	Range%	Letter	Range%
A	90 or above	B	75 - 79.99	C	60 - 64.99
A-	85 - 89.99	B-	70 - 74.99	D	40- 59.99
B+	80 - 84.99	C+	65 - 69.99	F	39 or less

Course Summary:

Date	Details	Due
Sun Sep 5, 2021	Homework 1: Vector Analysis (https://fiu.instructure.com/courses/116759/assignments/1466311)	due by 11:59pm
Mon Sep 6, 2021	Veterans Day (https://fiu.instructure.com/calendar?event_id=487671&include_contexts=course_116759)	12am
Sun Sep 19, 2021	Homework 2A: Electrostatics (https://fiu.instructure.com/courses/116759/assignments/1466324)	due by 11:59pm
Sun Sep 26, 2021	Homework 2B: Electrostatics (https://fiu.instructure.com/courses/116759/assignments/1532207)	due by 11:59pm
Wed Sep 29, 2021	Quiz 1: (https://fiu.instructure.com/courses/116759/assignments/1466339)	due by 11:59pm
Sun Oct 10, 2021	Homework 3A: Potentials (https://fiu.instructure.com/courses/116759/assignments/1524284)	due by 11:59pm
Sun Oct 17, 2021	Homework 3B: Potentials (https://fiu.instructure.com/courses/116759/assignments/1524285)	due by 11:59pm
Mon Oct 25, 2021	Quiz 2: (https://fiu.instructure.com/courses/116759/assignments/1524279)	due by 11:59pm
Sun Oct 31, 2021	Homework 4A: Electric Fields in Matter (https://fiu.instructure.com/courses/116759/assignments/1524293)	due by 11:59pm
Mon Nov 1, 2021	Last Day to Drop with DR (https://fiu.instructure.com/calendar?event_id=487673&include_contexts=course_116759)	12am

Date	Details	Due
Sat Nov 6, 2021	Homework 4B: Electric Fields in Matter (https://fiu.instructure.com/courses/116759/assignments/1524294)	due by 11:59pm
Mon Nov 15, 2021	Quiz 3: (https://fiu.instructure.com/courses/116759/assignments/1524280)	due by 11:59pm
Tue Nov 16, 2021	Homework 5A: Magnetostatics (https://fiu.instructure.com/courses/116759/assignments/1524297)	due by 11:59pm
Thu Nov 25, 2021	Thanksgiving (https://fiu.instructure.com/calendar?event_id=487669&include_contexts=course_116759)	12am
Fri Nov 26, 2021	Thanksgiving (https://fiu.instructure.com/calendar?event_id=487670&include_contexts=course_116759)	12am
	Homework 5B: Magnetostatics (https://fiu.instructure.com/courses/116759/assignments/1524298)	due by 11:59pm
Mon Dec 6, 2021	Homework 6: Magnetic Fields in Matter (https://fiu.instructure.com/courses/116759/assignments/1524299)	due by 11:59pm
Wed Dec 8, 2021	Final Exam (https://fiu.instructure.com/courses/116759/assignments/1466340)	due by 11:59pm