

**Physics 171.301: Introduction to Electromagnetic Theory**  
**Fall Semester, 2010**

**Course Syllabus**

Instructor: Prof. C. **L.** Chien (the middle initial is crucial)  
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**Course Website:** [http://www.pha.jhu.edu/courses/171\\_301/](http://www.pha.jhu.edu/courses/171_301/)

**Overview:** Introduction to Electromagnetic Theory (171.301) is the first semester of a two-semester course. It covers electrostatics, magnetostatics, and electrodynamics. In the second semester (171.302) electromagnetic radiation and other subjects will be covered.

**Prerequisites:** Physics 171.101-102 or 171.105-106, Linear algebra and calculus 110.201-202, or permission of the instructor.

**Corequisites:** Differential equations 110.302

**Class Schedule:**

<b>Lectures:</b>	Tuesday & Thursday	9 -10:15 AM	Bloomberg 274
<b>Conference:</b>	Friday	10 -10:50 AM	Bloomberg 274

**Required Textbooks:**

1. **David J. Griffiths, “Introduction to Electrodynamics,” (3<sup>rd</sup> Edition) Prentice Hall**  
(ISBN: 0-13-805326-X)

**Other Textbooks:**

1. Heald and Marion, “Classical Electromagnetic Radiation,” (3rd Edition) Brooks/Cole (ISBN: 0-03-097277-9)
2. Jackson, “Classical Electrodynamics,” (3<sup>rd</sup> Edition) Wiley (ISBN: 0-471-30932-X).

The book by Griffiths is the main textbook, from which most homework problems will be assigned. 171.301 will cover up to the middle of Chapter 7, just before the Maxwell Equations.

The book by Heald and Marion has more extensive discussions on radiation.

Jackson’s book is a classic and has been the sole graduate text for many years.

**Make-up classes:**

Occasionally, I need to be out of town. We’ll find other hours for make-up classes, or I’ll ask someone to take my class.

**We need to settle the time for the other hours for make-up classes.**

**e-mail addresses:** We communicate mostly by e-mail. You need to register in the class to receive e-mail.

## Requirements and Grading:

	<u>When</u>	<u>%of grade</u>
Homework	Weekly	25
Mid-term exam	Friday, October 22, 2010	25
Final Exam	to be determined	50

### **Homework: Problems will be assigned from textbooks or other sources.**

Homework will be assigned weekly in class or posted on the web. You have about one week to complete before handing them in on Friday in conference. Late homework generally will not be accepted. Solution sets will be available in conference or on the course's website shortly thereafter the due date.

**Policy on Collaboration:** Doing the homework is crucial to learning the material in this class. Working together can be useful and productive, and hence is not forbidden, provided that all parties put in equal efforts. It is strongly recommended that you not collaborate until you have each thought about and tried the homework. Outright copying of others homework is not allowed. If you do not put this effort in on your own, you will not learn the material, and it will be readily apparent on the exams.

*The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.*

*Report any violations you witness to the instructor. You may consult the associate dean of students and/or the chairman of the Ethics Board beforehand. See the guide on "Academic Ethics for Undergraduates" and the Ethics Board web site (<http://ethics.jhu.edu>) for more information.*

**H1N1 Precaution:** Do not come to class if you have flu symptoms.

**Physics 171.301**  
**Introduction to Electromagnetic Theory, Fall 2010**  
**Approximate Schedule**

<u>Week</u>	<u>Dates</u>	<u>Reading</u>	<u>Topics</u>
1	8/30-9/3	Chapter 1	Vector calculus
2	9/6-9/10	Chapter 1	Curvilinear coordinates and $\delta$ function
3	9/13-9/17	Chapter 2	Electric field and potential
4	9/20-9/24	Chapter 2	Work, energy, and conductors
5	9/27-10/1	Chapter 3	Laplace's equation
6	10/4-10/8	Chapter 3	Image charges, multipole expansion
	<b>10/11</b>	<b>Fall Break</b>	
7	10/12-10/15	Chapter 4	Dielectrics
8	10/18-10/22	Chapter 4	Dielectrics
	<b>Mid-Term Exam: October 22 (Friday), 2010 (Chapters 1-3)</b>		
9	10/25-10/29	Chapter 5	Magnetostatics
10	11/1-11/5	Chapter 5	Vector potential
11	11/8-11/12	Chapter 6	Magnetic materials
12	11/15-11/19	Chapter 6	Magnetic materials
13	11/23 11/25-11/29	Chapter 7	Electrodynamics <b>Thanksgiving Holiday</b>
14	11/29-12/3	Chapter 7	Contingency
15	12/4 – 12/7		Reading Period
16	12/8-12/17		<b>Final Exam (date to be determined)</b>