Physics 3301:

Electricity and Magnetism

Fall 2014

Course online: log into TUportal and click on the Blackboard link: *E&M Fall 2014*

Class: TR 2:00-3:20 PM, Barton BA 106

Lab sessions: Tuesdays (sec 001) and Thursdays (sec 002) 11:00-12:20PM, Barton BA 106

Lecture Instructor: Professor Zbigniew Dziembowski

E-mail: dziembow@temple.edu

Office: Barton Hall BA225

Office hours: Monday 4:00-5:00PM and TWR 3:30-4:30PM or by appointment

Laboratory Instructor: TBA

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\varepsilon_0}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{B} = \mu_0 \mathbf{J} + \mu_0 \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t}$$

What are the goals of the course?

The lecture part of the course is an introduction to the basic theoretical ideas of electrodynamics. The topics to be discussed are electrostatics, magnetostatics, microscopic interpretation of polarization P and magnetization M, Faraday's law, self and mutual inductance, integral and differential forms of Gauss, Ampere, and Faraday laws; AC circuits; introduction to the displacement current and Maxwell's equations.

Required text: Griffiths, "Introduction to Electrodynamics" 4/E, Addison-Wesley ISBN: 9780321856562

Recommended Physics II texts: Halliday and Resnick Fundamentals of Physics, 3/E Wiley and "The Feynman Lectures on Physics," Volumes 2, Publisher: Addison-Wesley

Physics 3301 on Blackboard: Gradebook will be posted on Blackboard.

Academic requirements for the lecture part:

Problem sets are issued on Tuesday or Thursday, and are due on Thursday of the following week at the beginning of class. No late problem sets will be accepted. This is for practical, not punitive reasons; the problem set solutions will be posted on BB on the due date. If you have an emergency please let me know, and I will excuse a set.

I encourage students to work together on problem sets. However, you must generate solutions by yourself; simple copies of answers will not be accepted. Be warned that if you are collaborating too much and not learning on your own, you may find that your problem set scores outpace your understanding of the material. This tends to result in very unpleasant surprises when exams come around.

Academic requirements for the lab part:

After each lab session write a brief (about three-four pages) lab report. Use narrative form and organize your report into the following six sections:

1. Descriptive title and names of all students participating in the experiment. Your name has to be underlined.
2. Objectives. What significant question has been investigated in the experiment?
3. Theory background. A description and derivation of the pertinent theory that supports the experiment to demonstrate your understanding of the principles being studied.
4. The experimental apparatus and instrumentation. Describe data acquisition system.
5. Presentation of results. Display data in graphical or tabular form. Fit lines and curves to data points in graphs.
6. Discussion of results. Identify the sources of errors. Compare the measured and accepted values.

Grading policy: The course grade is based on the accumulation of about **1400** points. These points are distributed as follows:

Laboratory component (pre-tests, lab reports)	400
PSW 12 @ 30	360
Mid-term exam	200
Final exam	400
TOTAL	**1360 points**

Grades will not be curved. The following scale will be used for letter grades: A: 85-100, B: 75-85, C: 60-75, D: 50-60, F less then 50. A sheet with detailed grading ranges is posted on Blackboard.

Incomplete: The grade of "incomplete" used on final grade reports indicates that the work is satisfactory as of the end of the semester, but has not been completed. The grade of "incomplete" may be given only when the completed portion of a student's work in the course is of passing quality-see Student Handbook for details. Only extreme hardship cases will be considered.

The Disability Disclosure Statement: Any student who has a need for accommodation based on the impact of a disability should contact me privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at 215- 204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities.

- **Last day to drop the course** (tuition refund available): **Monday, September 8.**
- **Withdrawal from classes**: Last day to withdraw: **Tuesday, October 21**

Physics 3301: Course schedule (Fall 2014)

Wks	Contents:	**Reading/Griffiths 4th ed**
#1 Aug. 25	Unit 1: Electric fields in vacuum	2.1
#2 Sep. 1	Unit 2: Electric potential	2.3
#3 Sep. 8	Unit 2: Electric potential	2.3, 3.4
#4 Sep. 15	Unit 3: Gauss's law	2.2
#5 Sep. 22	Unit 4: Electric fields in dielectrics	4.1, 4.2
#6 Sep. 29	Unit 4: Electric fields in dielectrics **Mid-term exam (Thu, October 2nd Unit 1-3)**	4.3, 4.4
#7 Oct. 6	Unit 5: Steady electric currents	7.1
#8 Oct. 13	Unit 6: Magnetic fields in vacuum	5.1, 5.2
#9 Oct. 20	Unit 7: Ampere's law	5.3
#10 Oct. 27	Unit 8: Magnetic vector potential	5.4
#11 Nov. 3	Unit 9: Electromagnetic induction	7.2
#12 Nov. 10	Unit 10: AC-current circuits	notes
#13 Nov. 17	Unit 10: AC-current circuits Unit 11: Maxwell's equations	notes 7.3
#14 Nov. 24	Fall Break (no classes held)	
#15 Dec. 1	Unit 12: Magnetic fields in matter	6.1 - 6.4
Final Exam (cumulative), Tuesday, Dec 16, 1:00-3:00PM		