SYLLABUS
PHYSICS 3342
PHYSICS FOR BIOSCIENCE II
FALL 2007

Class meeting: Tuesday and Thursday, 2:30 to 3:45 pm in FN 2.102 (Kusch Auditorium). The first class meeting is on Thursday, August 16

Instructor: Robert Glosser, Founders Bldg. Room FO2.724, 972 883 2876
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Office Hours: Tuesdays and Thursdays, 3:45 to 4:45pm or by appointment.

Teaching Asst.: Faranak Zarnani, Founders Bldg. Room FO1.428, 972 883 2867
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Recitations: to be arranged

Office Hours: by appointment (e-mail or call)

Text: **UNIVERSITY PHYSICS,** 11th Ed., (vol. 2-Electricity and Magnetism or the full volume) by Young and Freedman. If you are purchasing the text for the first time, be certain it includes the student access kit in order to do on-line homework. If you already have the 11th edition and are not already registered, you will need to register at <www.masteringphysics.com>so that you can access the homework web site for this class. The cost is $44.50 and requires a credit card.

Class Announcements: Class announcements, homework solutions and corrections will be found on http://webct.utdallas.edu/ Your UTD user NET ID and password will give you access to this. You are expected to check this site regularly.

Prerequisites: PHYS 3341 (Physics for Bioscience I) and MATH 2419 (Calculus II) or equivalent. Student must register for Physics Lab II (PHYS 2126) (No exceptions to this will be allowed without the instructor's and/or other advisor's permission.)

Exams: There will be three semester exams and a final.
Semester Exam test dates are:
Exam I-Tuesday, September 11, 2:30 to 3:45pm
Exam II-Tuesday, October 2, 2:30 to 3:45pm
Exam III-Thursday, October 25, 2:30 to 3:45pm
Final exam-Thursday, November 29, 2:00 to 4:45pm

All exams in the classroom or other assigned rooms.

Exams and quizzes will be CLOSED BOOK. It is expected that a student will have a basic scientific calculator and writing implements. *All books, notes, computers, programmable calculators, communicating calculators, Palm Pilots or equivalents, cellular phones, as well as backpacks, purses, etc. are to be placed at the sides or front of the room during an exam. A student must produce his/her valid student identification card or Texas Driver's if requested in order to take any exam or quiz.* Any student INVOLVED in cheating will be reported to the Dean of Students with the expectation of being dropped from the course with a grade of F in addition to any penalties administered by the Dean.

Your course grade will be based on the two best of the three semester exams plus the final exam, homework average and quiz average. Each of the highest two (out of three) semester exams counts for 25% of your grade. **No make up exams will be given**. The final exam counts for 25% of your grade. Homework, quizzes and attendance count for 25% of your grade.

Homework:

Homework is graded and assignments are posted in the Mastering Physics web site. In order to do the homework, you must have access to the internet. The basic instructions are as follows:

a. Log on to <www.masteringphysics.com>

b. Click on REGISTER using the ACCESS CODE in the student access kit that came with your text and follow on-screen instructions. The course ID is MPRASMUSSEN0014. For your student ID, use 3342 + the 1st 3 letters of your first name + the first three letters of your last name. Please make certain that the name you use for this website corresponds to your name of record.

c. Once you are registered, you will have access to your assignment package for the particular section being covered in class.

d. You will have one week after assignment to work the problems.

e. After the assignment is no longer available, the solution to the appropriate problems in the text will be posted on WebCT.

Quizzes:

There will be reading quizzes to be completed prior to most classes. The assignment will be on WebCT http://webct.utdallas.edu/ and can be accessed by clicking on “ASSESSMENTS.” The quiz is only available from noon of the day prior to the particular class day until 2:00pm of the class day. There are no makeup quizzes. However, the basis for grading will be the total number of possible points less at least 10% of that number.

Homework solutions will be available on the Web http://webct.utdallas.edu/. The assigned homework will provide a basis for exams. ***The student is expected to work out the homework on a regular basis and is responsible for obtaining the solutions.***

Listed below are the chapters to be covered and reading assignments. Assignments will consist of approximately 10-16 problems per week.

Chap. 21. Electric Charge and Electric Field
Chap. 22. Gauss's Law
Chap. 23. Electric
Potential
Chap. 24. Capacitance and Dielectrics
Chap. 25. Current, Resistance and Electromotive
force
Chap. 26. Direct Current
Circuits
Chap. 27. Magnetic Field and Magnetic Forces
Chap. 28. Sources of Magnetic Field
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Chap. 29. Electromagnetic Induction
Chap. 30. Inductance
Chap. 31. Alternating Current (if time permits)
Chap. 32. Electromagnetic Waves
Chap. 33. Nature and Propagation of Light
Chap. 34. Geometric Optics
Radioactivity

Date	Lecture	Reading Assignment
8/16	**L1 Charges, Coulomb's Law**	**21.1-3**
8/21	**L2 Electric fields**	**21.4-7, 22.1-2**
8/23	**L3 Gauss's Law**	**22.3-5**
8/28	**L4 Electric potential & energy**	**23.1-2**
8/30	**L5 Electric potential cont**	**23.3-5**
9/4	**L6 Capacitors**	**24.1-2**
9/6	**L7 Capacitors & dielectric**	**24.3-6**
9/11	**Exam 1 (21-24)**	
9/13	**L8 Current, batteries**	**25.1**
9/18	**L9 Resistors, conductors**	**25.2-3, 25.5-6**
9/20	**L10 Circuits**	**25.4, 26.1**
9/25	**L11 Circuits cont**	**26.2-4**
9/27	**L12 Magnetic fields & forces**	**27.1-4**
10/2	**Exam 2 (25-26)**	
10/4	**L13 Magnetic energy &crossed fields**	**27.5-9**
10/9	**L14 Biot Savart, Ampere**	**28.1-7**
10/11	**L15 Induction (Faraday & Lenz)**	**29.1-4**
10/16	**L16 Inductance & inductors**	**29.5, 30.2**
10/18	**L17 Inductance cont., magnetic materials**	**30.1, 30.3,28.8**
10/23	**L18 Maxwell's Laws & Other Circuits**	**30.4-6, 29.7**

10/25	**Exam 3 (27-30)**	
10/30	**L19 AC Circuits & Electromagnetic Waves**	**31,32**
11/1	**L20 Optics**	**33.1-6**
11/6	**L21 Mirrors**	**34.1-2**
11/8	**L22 Lens**	**34.3-4**
11/13	**L23 Optical Instruments**	**34.5-8**
11/15	**L24 Radioactivity**	
11/20	**Review**	
11/22	**Thanksgiving**	
11/29	**Final @ 2 pm**	

STUDENT LEARNING OBJECTIVES AND OUTCOMES

Upon completion of this course the student will be expected to have achieved the following:

1. Be able to calculate forces between charges and charge distributions using Coulomb's Law and Gauss's Law
2. Calculate an electric field from potential differences and vice versa
3. Calculate capacitance for simple charge configurations
4. Analyze simple electrical circuits
5. Calculate magnetic fields using either the Biot-Savart Law or, where appropriate, Ampere's Law.
6. Apply Maxwell's Equations to show the existence and properties of electromagnetic waves

PURPOSE OF THE COURSE

This course is devoted entirely to electricity and magnetism and basic optics and radioactivity with applications to the biosciences. We start from the basic concepts of electric charge and the force between them and then go on to develop the concepts of the electric field and electric potential. We learn about capacitance and energy storage in an electric field. At this point we allow charge to move from which we develop the notion of current and resistance. A current in turn intrinsically produces a magnetic field and we examine the force a magnetic field exerts on moving charges and learn how to relate a magnetic field to the current that produces it. Now we are in a position to describe the effect of a time varying magnetic and electric fields. This leads us into Maxwell's Equations and electromagnetic waves. This provides and entrée into basic optics. Along the way, problems will be assigned or classroom examples will be presented that will demonstrate applications to biological systems.

The applications of this topic are fundamental to our society as it encompasses such matters as communication by electromagnetic radiation, functioning of our nervous system and operation of all electronic circuits.

MASTERING THE COURSE

There are some general principles that may prove helpful to you in mastering this course and, more generally, understanding what electricity and magnetism is all about and how it fits into the rest of science and technology.

First is the expectation that you come into the class with sufficient skill in mathematics. This includes algebra, geometry, trigonometry, integral and differential calculus.

Second it is assumed that you will work all the assigned problems, obtain solutions and seek help if clarification is needed. The assigned problems form a significant basis for exam problems.

Third and probably the most important principle is that you take all possible steps to master the ***CONCEPTS*** as they are presented in class and in the text. As we go through the course each new concept builds to some degree on the previous ones as well as concepts learned in Physics I (e.g.: work-energy, torque, vector and scalar products). Failure to master the concepts early in the course bodes poorly for what comes later. This Physics class is not for spectators! While working homework problems is essential, it is also imperative that you take time to understand the applicable concept or concepts, problem by problem. Since the exams and quizzes are closed book, necessary formulas and constants will be given but these can be helpful only if you understand the concepts.

CLASSROOM PROCEDURE AND DECORUM

The format of the class is primarily a lecture. At the same time I welcome questions or interruptions for clarification and discussion at any time during the lecture. In fact, there may be periodic breaks in the lecture in order to have class discussion on particular points. However cross conversations while I am lecturing or while another student is asking a question is rude and I view it most unkindly. While attendance is not mandatory, it is graded. I believe class attendance is important in order to receive maximum benefit from the course. *You are responsible for all material covered in class as well as material covered in the text that may not be covered in class unless the material is explicitly excluded.* The class will start promptly at 2:30pm and end at 3:45pm.

I look unkindly towards people who regularly turn up late or who leave in the middle of a lecture. Both are disruptive to the class. There are times when such situations are unavoidable in which case a word of explanation would be appreciated.