SYLLABUS

PHYSICS 3342
PHYSICS FOR BIOSCIENCE II
FALL 2005

Class meeting: Tuesday and Thursday, 2:00 to 3:15 pm in FN 2.102 (Kusch Auditorium). The first class meeting is on Thursday, August, 18

Instructor: Robert Glosser, Founders Bldg. Room FO2.724, 972 883 2876, glosser@utdallas.edu
Office Hours: Tuesdays and Thursdays, 3:15 to 4:15pm or by appointment.

Teaching Asst.: Jacob Moldenhauer, Founders Bldg. Room FO1.428, 972 883 2867, jam042100@utdallas.edu
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 $36 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 twice a week.

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 13, 2:00 to 3:15pm
Exam II-Thursday, October 6, 2:00 to 3:15pm
Exam III-Tuesday, November 1, 2:00 to 3:15pm
Final exam-Tuesday, 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 License*

(no other IDs are acceptable) 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 30% of your grade. Homework counts for 10% of your grade and your quiz average counts for 10%.

Homework:

Homework is graded and assignments will be made in class. 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 PHYS3342.
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 plus a day (ending nominally at 10:45 pm but not allowing for DST) 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.
f. Homework counts for 10% of your final grade. Your homework average will be based on the total number of possible points less 10% of that total.

Quizzes:

a. There will be pop quizzes given from time to time. There are no makeup quizzes.
b. Your quiz average (less the two lowest scores for quizzes) counts for 10% of your grade.

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

Listed at the end of this syllabus are the chapters to be covered. Assignments will be made in class and will consist of approximately 5-8 problems per class. From time-to-time additional special problems may be assigned.

PURPOSE OF THE COURSE

This course is devoted entirely to electricity and magnetism 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. 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 and quiz 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, I believe it is important, particularly with regard to the quizzes and I expect that you will attend every class. *You are responsible for all material covered in class as well as material covered in the text unless explicitly excluded.* The class will start promptly at 2:00pm and end at 3:15pm.

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.

Listed below are chapters to be covered. Problems will usually be taken from the list below and assignments will be made during each class session.

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 .
Chap. 29. Electromagnetic Induction
Chap. 30. Inductance
Chap. 31. Alternating Current (if time permits)
Chap. 32. Electromagnetic Waves