

PHYSICS FOR ENGINEERS II

PHY2044

SPRING 2007

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*"I know that I am mortal and the creature of a day;
but when I search out the massed wheeling circles
of the stars, my feet no longer touch the earth,
but, side by side with Zeus himself I take my
fill of ambrosia, the food of the gods."*

Claudius Ptolemy, ca. 90-170

WEB-SITE: I have constructed an extensive web-site for the course where you can find a wide range of information and help. **I URGE YOU TO GET AN E-MAIL ADDRESS IF YOU DON'T ALREADY HAVE ONE and PLEASE GET ACCESS TO THE INTERNET SO YOU CAN USE THE COURSE WEB-SITE; YOU WILL FIND IT USEFUL AND INFORMATIVE.**

<http://courses.science.fau.edu/~rjordan/phy2044/home.htm>

There is a **discussion forum** to help you exchange problems and ideas with each other, advice on **how to study**, copies of the **lecture slides** and **practice tests**.

GENERAL: We meet on Tuesdays and Thursdays from 9.30-10.50am in GE102. The first class is held on Tuesday January 9th. The only official holiday when there will be no classes is during Spring break, i.e., Tuesday March 6th and Thursday March 8th. The final test will be held on Thursday April 26th at 8.30am in GE102.

As we go through this course you may wonder why I frequently break the class into smaller groups, to answer questions or solve problems, etc. The reason is that I believe in active learning, an approach that involves us all - instructor and students - in the learning process. It will actually help you learn, understand and remember the course material!

IMPORTANT: *Each student has a unique ID for this class. To calculate your class ID, start with your social security number, e.g., assume it is 321-54-6798, then you simply add the three groups, e.g., (321)+(54)+(6798)=7173. So, 7173 is the class ID for that ss#. (NOTE: it is NOT the final 4 digits of your ss#). You will need to know your class ID in order to get quiz, test and homework grades.*

MATERIAL AND COURSE OBJECTIVES: This course is the second part of a two semester physics course for engineers. My aim is to provide you with a broad, rigorous introduction to physics of particular interest to engineering students; in this second part of the course we will study electricity, magnetism, electromagnetic waves and the properties of light.

Physics is basically an observational science ... we observe phenomena that occur in nature and

we try to find the rules, patterns and principles that control these phenomena. Understanding the patterns and rules requires a high level of creative and critical thinking ... in this course I want you to experience these levels of thinking. Learning to solve problems is essential and so I aim to teach you not only the general principles but how to apply them in specific situations.

However, (and to paraphrase Richard Feynman) you should appreciate that ... "*my main purpose is not to prepare you for examinations, nor prepare you for industry nor the military. Rather, my idea is to give you some appreciation of the world and the scientist's way of looking at it, which I believe is a major part of the true culture of modern times*". So I try to make the course enjoyable and educational at the same time by including anecdotes and stories about the scientists themselves ... you'll be surprised at some of the things they did (or had done to them)!

TEXT: "**Physics for Scientists and Engineers**" (Volume 2) by Paul A. Tipler and Gene Mosca (5th. edition). We will concentrate on chapters 21-32. Although "Physics for Scientists and Engineers" is the recommended textbook, I would recommend highly that you purchase also either: "**HOW TO SOLVE PHYSICS PROBLEMS**" by Robert Oman and Daniel Oman (published by McGraw-Hill, 1997) price \$14.95 or "**PHYSICS FOR THE UTTERLY CONFUSED**" by Daniel Oman and Robert Oman (published by McGraw-Hill, 1999) price \$14.95. These books contain test-taking tips and a good deal of material that should help you learn not only how to solve problems but to understand the concepts. They both contain essentially the same material although the former solves rather more problems.

COURSE REQUIREMENTS: There are **four components** that will count towards your final grade ...please note, there is no extra credit except as described in 3 and 4 below, which is available to the whole class:

[1]. I will set **three tests*** (each of 75 minutes duration). The TENTATIVE dates and the chapters to be examined are (PLEASE NOTE THEY MAY CHANGE DUE TO UNFORSEEN CIRCUMSTANCES):

TEST 1 Chapters 21-23	Thursday Febuary 8th.
TEST 2 Chapters 24-27	Thursday March 22nd.
TEST 3 Chapters 28-31	Thursday April 26th. (at 8.30am).

The questions on the tests will examine your ability to understand and apply the material by requiring you to think *creatively* and *critically*. More information on the types of questions can be found on the course web-site.

PLEASE NOTE, you **MUST HAVE A GENUINE AND VALID REASON** for missing a test, for example, surgery (with doctor's note), jury duty, etc., Please note that excuses like ... "*I had a headache*", "*My boss wanted me to work an extra shift*" ... simply will not cut it! I tell you the dates of tests at the beginning of the semester so you can make any necessary arrangements to be in-class. If you do have a valid reason you **MUST TELL ME IN ADVANCE** that you will be absent. You must be prepared to make up a test at a time that is convenient to both you and the instructor, but no later than one week after the original date of the test.

[2]. There will be **three quizzes** (each of 15 minutes) on material taken from the brain "busters" (on the web-site), "classproblems" (also on the web-site) and the conceptual questions at the end of each chapter in the textbook. The quizzes will be held during the class on the day before the test. **PLEASE NOTE** that there are no make-up quizzes.

[3]. You will also receive extra credit for using the **Classroom Performance System (CPS)** or "clickers"... *see the additional handout*. The credit earned will be on a sliding scale with a maximum

of 20 points for 100% correct answers over the semester.

[4]. You will receive extra credit for homework assignments (see below) on a sliding scale, with a maximum of 15 points.

Although I give a letter grade to each individual test or quiz; I accumulate the actual points earned and assess a final grade when all the assignments have been completed. I use a 'curve' that also takes into account the results from previous semesters in order to maintain consistency. Note also, your final grade may be increased by your score using CPS and by doing satisfactory homework assignments. **PLEASE NOTE: I DO NOT GIVE ANY EXTRA CREDIT ASSIGNMENTS TO INDIVIDUALS; EVERYONE HAS AN OPPORTUNITY TO GAIN EXTRA CREDIT BY USING CPS AND BY DOING THE ASSIGNED HOMEWORK.**

HOMEWORK: I assign and grade homework problems using the *University of Texas Homework Service* via the internet (*see the additional handout for details*). To use the homework system - which is free - you will need to get an "EID" from the University of Texas; all necessary information is supplied on an additional handout and on the course web-site. The problems I have selected should help you understand and apply the material and help prepare you for the tests, and the points gained for the homework problems will count towards your grade. Since homework is optional, is it worthwhile? ... well, in the Fall about 56% of students improved their grade by carrying out the extra credit assignments!

NOTE:

- The class number on the UT Homework Service web-site for this class is **32044** ... you will need this number in order to register for the service.
- You will have 10 days from the beginning of the course to register with the homework service. If you leave it later than this time you will have to see me.
- I will post the assignments well enough in advance to give you plenty of time to complete them before the due dates.
- You must check each assignment for the actual due date/time; it is printed at the top. Please note that the times are **central time**!

GRADING:

- Tests 1, 2 and 3 - 100 points each: Total 300 points.
- Each quiz - 20 points each: Total 60 points.
- CPS extra credit - 20 points max.
- Homework - 15 points max.

TOTAL POINTS AVAILABLE: (about) 395.

Please note that all tests and quizzes count towards your final grade. After each quiz/test you can find my best estimate of your current grade on the web-site.

OFFICE HOURS AND HELP: I will be available in my office (SE106) at times to be announced later. Also, you can contact me through e-mail (jordanrg@fau.edu) with PHY2044 in the subject line. However, if you have any questions about the course material or homework problems, you should contact the **discussion forum** first (see below).

DISCUSSION FORUM: There is a discussion forum on the web-site; the ID is **jordan** and the password is **physics**. It is a place where you can send any questions that you may have about the course material or homework problems. **This is a resource for all students in the class ... please feel free to answer any questions that your fellow students may pose ... I have set**

it up for YOU as an aid to learning. I will monitor the forum at regular intervals and answer any questions that do not receive satisfactory answers.

****PRACTICE TESTS:** I have set up practice tests on the web-site that cover the material to be covered on the “proper” tests. Each time you link to a test you will get a (different) series of questions that have been chosen randomly from a large bank of questions. The questions are multiple choice and are graded automatically.

****BRIAN “BUSTERS”:** Again, a series of brain “busters” will be available that are designed to improve your conceptual understanding of the material we cover in class. Answers are supplied.

**** I urge you to use the practice tests and brain “busters”. I believe you will find them useful when you prepare for the tests and quizzes.**

QUESTIONS IN THE BOX: Once we have started to course I will bring a “box” to class in which you can place questions of general interest but applicable to the course material. I will post the answers on the web-site. I guarantee every question will be looked at and answered.

CLASSROOM PERFORMANCE SYSTEM (CPS): Please see the additional handout.

SYLLABUS, INTRODUCTION and REVISION NOTES: On the course web-site you will find a detailed syllabus and links to an introduction and to revision notes and movies that that you may find useful including:

Introduction and definitions
Short biographies of scientists
Dimensional analysis
Conversion of units
Scientific notation
Significant figures
Errors and uncertainties
Trigonometric functions
Radians
Differentiation
Integration
Dot (or scalar) product
Cross (or vector) product
Equations of motion
Resolution of Forces
Dot (or scalar) product
Cross (or vector) product

Others may be added later.

OPEN COMPUTER LABS: The University provides a number of “open” computer labs that you can use on-campus to access the web-site; you can check schedules and other details at: <http://www.ecs.fau.edu/labs/open/>

ENJOY and GOOD LUCK !!

R.G. Jordan
January 2007