## PHYSICS 303: PHYSICAL THEORY FALL SEMESTER, 2014

Lecture:	Monday, Wednesday, Friday, 10:00 – 10:50 a.m., Room 109 Lewis Hall
Professor:	Dr. Thomas Marshall
Office:	Room 126 Lewis, 232-5325, e-mail: marshall@olemiss.edu
Office Hours:	MWF, 8:00-8:45 a.m. in my office (Lewis 126). MWF, 3:00-3:30 p.m. in my office (Lewis 126).

Text: Fundamentals of Physics, 7th ed., by Halliday, Resnick, and Walker (copies of this text are available on loan.) READ THE BOOK!!

Goals: This course is intended for physics majors that took trigonometry-based, introductory physics (Phys 213-214 at UM) instead of a calculus-based course (Phys 211-212 at UM). One goal of this course is to learn important physics concepts that depend heavily on calculus and are therefore usually skipped in trig-based courses. Since physics concepts are often best expressed in the language of calculus, another goal is to learn how to formulate basic physics concepts in terms of calculus. A related goal is to learn to use calculus with other math techniques to solve physics problems, both with the new concepts and also with concepts covered in the trig-based course. An overview of the topics and knowledge that should be acquired is given below. As in most physics classes, critical thinking, analytical reasoning, and problem solving skills will be emphasized. These abilities are crucial in physics (and can be carried over into many other fields or endeavors).

Topics to be covered include, but are not limited to:

- 1. Calculus approach to velocity, acceleration, circular motion (chapters 2, 3, 4)
- 2. Calculus approach to work-kinetic energy theorem and potential energy (ch. 7, 8)
- 3. Calculus approach to rotational motion (ch. 10)
- 4. Calculus approach to Newton's law of gravity, including proofs of Newton's 2 shell theorems (ch. 13)
- 5. Calculus approach to electric fields, including distributed charges, and Gauss's Law (ch. 21, 22, 23)
- 6. Calculus approach to magnetic fields, including Ampere's law (ch. 29)
- 7. Calculus approach to Faraday's law and Maxwell's equations (ch. 30, 32)

Grading Scale: A's: 90-100%, B's: 80-89%, C's: 70-79%, etc. The +/- grading scale will be used.

Grades will be based on homework, tests, and the final exam:

Homework	25 %
Two tests	25 % each
Final exam	25 % (Friday, Dec. 12 at 8:00 a.m.)
	100 %

If you must miss a test or the final exam because of the following reasons, please inform Dr. Marshall ahead of time to arrange an accommodation: (1) a civil duty (e.g., jury duty or military service), (2) official University competition, performance, or travel, (3) religious observations, or (4) certain scheduled medical procedures. Missing a test or the final exam without prior notification of Dr. Marshall may lead to receiving a zero on the test/exam. However, illnesses and other problems, which sometimes occur unexpectedly, may lead to an accommodation in this policy.

Homework is assigned almost every class period and is due at the beginning of the next class period. Homework assignments turned in at or before the second class meeting after the original due date, will be graded with a 25% late penalty assessed. Homework assignments turned even later will receive a zero. This policy may be adjusted for extended excused absences (e.g., due to an extended illness).

Homework is one way of practicing and applying your knowledge physics. You won't learn much physics if you don't practice using it.

## **Homework Rules:**

- 1. Homework is due at the **beginning** of class on the due date.
- 2. Homework paper should be 8.5 x 11 inches with **no torn** or **tattered edges**. Homework papers should be **stapled**.
- 3. Show all your work; the answer alone is not worth anything. Homework problems must include enough **English** to be understandable.
- 4. Homework answers should have <u>units</u> and a reasonable number of significant digits.

Class attendance is not required, but is strongly encouraged, since everything you need to know in the class will be discussed in class. Arriving late to class or leaving early distracts everyone (me especially). Both are rude, so please avoid them. If you are taken ill during class, please feel free to leave.

It is University policy to provide, on a flexible and individual basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities, which have been verified through the <u>Office of Student Disability Services</u>, need to contact me at the beginning of the semester to discuss their individual needs for accommodations.