PHYS2796 Introduction to Modern Physics Spring 2015

At the start of the 20th Century, fundamental changes came to our understanding of nature. We will study these changes, followed by an examination of modern ways of understanding molecules and solids, subatomic phenomena, and astrophysical observations.

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LECTURES: Mon, Wed, Fri SERC 223 1:00-1:50
LABS: Tue *or* Thu SERC 223 2:00-4:50

TEXTBOOK: Krane, *Modern Physics, 3e* Wiley (2012)

GRADING POLICY Grades will be determined as follows:

Quiz on math prerequisites	2%	Laboratory reports	40%
Homework assignments	13%	Mid term exam	15%
Pre-laboratory quiz	5%	Final exam	25%

where the cutoffs for course grades A, B, C, and D are 90%, 80%, 70%, and 60% respectively. I expect to make some use of "grade modifiers", that is $\pm$ after the grade. I may make other adjustments to the overall grading scheme if there are special circumstances.

Homework problems are listed on the class schedule. They are the numbered end-of-chapter "Problems" from Krane. Howework is due every Friday *at the start of class* except the first week (math quiz) and the first week back from break (midterm exam).

The math quiz, midterm, and final exam are all open book/open notes. You are welcome to bring and consult whatever resources you like to an exam, except another human. Please do not make the mistake of thinking this means that you do not need to prepare for the test!

ACADEMIC INTEGRITY STATEMENT

I want you all to collaborate with each other on homework as much as possible, and to come for help during office hours, help sessions, or at any mutually convenient time. However, it is very important for me to trust that you are handing in your own work. (Just the same, it is important that you trust me to organize and teach a quality course for you.) There are formal guidelines on all this, but to put it simply,...

Don't copy someone else's homework, and don't cheat on exams. If I suspect you of either, I will ask for an explanation. If your explanation is unsatisfactory, you will be given a grade of zero and reported to the Dean's office. If this happens more than once, you will be given an F for the course.

GENERAL COURSE INFORMATION

To understand physics is *not* to collect facts. Physics is about *why* things are the way they are, and my goal in this course is to get you to think that way. We'll start with the foundational changes of the 20th Century, namely special relativity and quantum mechanics, and then see how they led to "modern" physics.

Mathematics is critical to the kind of deductive reasoning needed to understand the *why* of physics. You'll take more math courses at the same time as you take advanced physics course, so don't be afraid if you see some math topic in physics before you see it in math. I will guide you through that, and I've provided you with some notes on the mathematics we will use in this course.

To that end, our second class is for you to come with math questions, and the third is a math quiz. The quiz only counts for a tiny fraction of your grade, so don't sweat it. Mostly, I want it so that I can get a better idea of how much math you know.

The rest of the syllabus mostly follows the book by Krane. It is posted online, and may change from time to time. I will email you when that happens, but you can always check the date stamp to make sure you're looking at the current version. This is probably most important when you are starting to work on the homework assignment.

For classes that follow Krane, the book sections are indicated on the syllabus. Sometimes it says *Notes* instead, which means that my class notes will be more useful to you than the textbook. This is because some topics (like the quantum mechanical two-state problem, and its application to my own research area in neutrino physics) are things I think you should see, but are not covered in the book.

The laboratory periods are an important component. The first few lab classes are informational, but actual experiments start in Week #5, with a "pre lab" on half-life measurements, that everyone will do. You will do five more labs in Week #6 through Week #10; the material listed on the lab syllabus is only there to show the list of available setups. You will rotate through them over these lab periods.

This is a **writing intensive** course, and Temple University mandates that at least 40% of your grade is based on writing. In this course, that grade comes from your lab reports, including turning in a draft (which will be graded) and then a final version. Don't leave your lab report writing until the last minute! We'll talk about this more over the term.