PHY362K Applications of Quantum Mechanics
First Day Handout Spring 2013

Class Meetings: Unique number 58610 (MWF 11:00 - noon) RLM 7.104

Instructor: Greg O. Sitz, Office: RLM 10.313, Office Hours: Th 3:30-5:00, W 1:30-2:30 or by appointment. Phone: 471-0701, email: `gositz@physics.utexas.edu`

Grader: TBA

Prerequisites: PHY373, Modern Physics II: Quantum Mechanics. This will be enforced, for good reason.

Text - *Introduction to Quantum Mechanics* Second Edition, by *David J. Griffiths*. (The first edition should work, but problems will be assigned out of the book, and there is no guarantee that they are the same between the editions.) The material covered and the order in which it will be covered are shown on the next page.

Grading - The breakdown is: Homework 20%, In-class exams (best 2 of 3): 40%, Final Exam 40%. Homework and test scores will be weighted as just described and a composite score (S) of between 0 and 100 for the course will be calculated. The final grades for the course will be determined using this composite score as follows: $S \geq 85 \Rightarrow$ A; $85 > S \geq 70 \Rightarrow$ B; $70 > S \geq 60 \Rightarrow$ C; $60 > S \geq 50 \Rightarrow$ D; $50 > S \Rightarrow$ F. The composite score will not be rounded, that is 84.99 is less than 85.

- **Homework - 20% of grade** - Homework will be assigned approximately weekly during the semester. All homework assignments will be weighted equally (even though they may cover different amounts of material and have different numbers of problems). The lowest score will be dropped in computing the average.

- **In-class Exams - 40%** - Three in-class exams will be given: dates are Feb. 13, Mar. 27 and Apr. 26. The scores from the best two of these three exams will count toward your final grade. Each will be be worth 20%.

- **Final Exam - 40%** The final is comprehensive and it is *required*. It is scheduled for Tuesday, May 14, 9:00-12:00 noon.

The exams will be closed book and closed notes, and no calculators or other aids of any type are allowed. A cover sheet with relevant formulas and constants will be provided. This cover sheet will be available in advance of the exams. Even though only two of the three in-class exams will count toward your semester grade, you are strongly advised to take all three. The final exam will be cumulative, and the best way to prepare for the final is to keep up with the material as it is covered in class. This means being prepared for and taking all the in-class exams.

Unless a *substantial* illness or family emergency is documented with a note from a physician or the dean's office, no make-up exams will be given. Any potential absences must be discussed with Dr. Sitz *prior* to the exam in order to have a make-up. Make-up exams will be oral and taken within 72 hrs. of the missed exam. Under normal circumstances, a missed exam will simply be your dropped score.

If you are absent from a examination for the observance of a religious holy day you may complete the work missed within a reasonable time after the absence, if proper notice has been given. Notice must be given at least seven days prior to the exam.

Other: The last day to drop the course for academic reasons is April 1, 2013.

Please notify the instructors of any modification/adaptation you may require to accommodate a disability-related need. You will be requested to provide documentation to the Dean of Students' Office, in order that the most appropriate accommodations can be determined. Specialized services are available on campus through Services for Students with Disabilities.

Alternatives: This document (as well as other course related material, including homework and test scores) will be available on BlackBoard.

Syllabus
(probable, but subject to change)

Week of January 14:	Review, Perturbation Theory (Griffiths, Section 6.1)
January 21:	more Perturbation Theory, examples (Griffiths, Section 6.1)
January 28:	degenerate Perturbation Theory, fine structure (Section 6.2, 6.3)
February 4:	atomic Zeeman (Section 6.4), and Hyperfine structure (section 6.5)
February 11:	more Hyperfine and Test 1 on 2/13
February 18:	Time Dependent PT (Chapter 9)
February 25:	continued (Supplemental material)
March 4:	Variational principle (Section 7.1)
March 11:	Spring Break
March 18:	more Variational principle
March 25:	Helium atom and Test 2 on 3/27
April 2:	multi-electron atoms (Section 7.2)
April 8:	Hydrogen molecule ion (Section 7.3)
April 15:	more molecules (Supplemental material)
April 22:	still more molecules (Supplemental material) and Test 3 on 4/26
April 29:	solids or scattering (Supplemental material)

Quotes

"I think I can safely say that nobody understands Quantum Mechanics" -R. P. Feynman

"It is often stated that of all the theories proposed in this century, the silliest is quantum theory. In fact, some say that the only thing that quantum theory has going for it is that it is unquestionably correct." - Michio Kaku

"If quantum mechanics hasn't profoundly shocked you, you haven't understood it yet." - Niels Bohr

"How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?" - Sherlock Holmes (Sir Authur Conan Doyle)

"The paradox is only a conflict between reality and your feeling what reality ought to be." -R. P. Feynman

"It appeared to me that hydrogen . . . more than any other substance is destined to open new paths to the knowledge of the structure of matter and its properties." -Johann Jacob Balmer (1884)

"Had I known that we were not going to get rid of this damned quantum jumping, I never would have involved myself in this business!" -Erwin Schrödinger

"those that can't do, teach, and those that can't teach, teach gym." -Woody Allen