PHYS 5300
Modern Quantum Mechanics
Spring 2014

Professor: Dr. Beth Thacker
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Schedule: TR 2:00-3:20pm

Office Hours: TBA

Course Text: We will draw on a number of texts. We will start at the level of

Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles, Robert Eisberg and Robert Resnick, Wiley; 2nd edition (January 1985), ISBN-10: 047187373X, ISBN-13: 978-0471873730.

and

Introduction to Quantum Mechanics, David J. Griffiths, Pearson Prentice Hall, 2nd edition (April 2004), ISBN-10: 0131118927, ISBN-13: 978-0131118928.

Then move to the level of

Introduction to the Quantum Theory, David Park, Dover Publications; 3rd edition (November, 2012).

Elementary Quantum Mechanics, David S. Saxon, Dover Publications, (June 2013).

Principles of Quantum Mechanics, R. Shankar, Springer 2nd edition, (September 1994).

Course Coverage: Schrödinger equation, probability, one-dimensional problems, (free particle, simple potentials, harmonic oscillator), mathematical formalism, three-dimensional problems (hydrogen atom, angular momentum, spin, addition of angular momentum), two-level systems, perturbation theory.

The Nature of the Course: The course will be taught interactively. You will be asked to read ahead and be prepared to present or discuss the reading in class. We will focus both on conceptual and quantitative aspects of the material. You will work on problem-solving during class and be required to explain your reasoning, as well as to solve computational problems. We will try to understand quantum mechanics and interpret the results, as well as be able to solve problems. When solving problems, the process by which you solve a problem will be more important than the final answer and you will be graded on your problem-solving process on homework, quizzes and exams.

Expected Learning Outcomes:

Students should be able to demonstrate their understanding of the material covered by their ability to solve problems and answer questions on the content covered. They should

be able to demonstrate an understanding of the development, use and predictive power of quantum mechanics that is consistent with experimental evidence.

Methods for Assessing Expected Learning Outcomes:

Learning outcomes will be assessed through quiz, homework and exam problems that require students to show their calculation and explain their reasoning and in-class discussions with their peers.

Participation: As the class will be taught interactively, class participation is required. This includes reading ahead, solving problems and being prepared to discuss in class when asked. There may be pre-tests, post-tests and surveys given during class. These may not be graded, but counted as part of your participation grade. You will receive full credit, if you do them and lose participation points, if you don't. Class participation will count as 20% of your grade.

Homework: Homework problems will be assigned periodically. They will be graded and count as 30% of your grade.

Exams: There will be a two midterm exams. Midterm exams will count as 30% of your grade.

Final Exam. The final exam will count as 20% of your grade.

Grades: The grade will be weighted as follows:

Participation	20%
Homework	30%
Midterm Exams	30%
Final Exam	20%

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office in 335 West Hall or 806-742-2405.