Course Syllabus

PHY 5645 Quantum Mechanics A

Fall 2010 Lectures: Tue-Thu 11:00 a.m. -12:15 p.m. (UPL 110)
starting Tuesday, August 24.

Instructor: Efstratios Manousakis
e-mail: manousakis@gmail.com
Office hours: Tue 1:15-2:15pm (Keen 612)

TA : Olga Abramkina
e-mail: abramkina@gmail.com
fice hours: by appointment

This is the first semester of a two-semester graduate level sequence. Its goal is to explain the concepts and mathematical methods of Quantum Mechanics, and to prepare students to solve quantum mechanics problems arising in different applications. The emphasis of the courses is equally on conceptual grasp of the subject as well as on problem solving. This sequence of courses builds the foundation for more advanced courses and graduate research in experimental or theoretical physics.

Prerequisites: PHY4604 and PHY4605, or equivalent undergraduate quantum mechanics courses.

Brief outline:

- The physical basis of Quantum Mechanics

- Schroedinger equation. One-dimensional potentials.

- Operators, eigenfunctions, and symmetry. Expectation values. Discrete eigenvalues, bound states.

- Harmonic oscillator and hydrogen atom.

- Continuous eigenvalues and collision theory.

Recommended Literature:

The instructor will follow his own notes compiled from several books. Any graduate Quantum Mechanics book can be used as a reference book. Below is a list of the more traditional textbooks. Actually reading a textbook is strongly recommended.

1. Gordon Baym, Lectures on Quantum Mechanics.

2. E. Merzbacher, Quantum Mechanics.

3. L.I. Schiff, Quantum Mechanics.

4. L.D. Landau and E.M. Lifshitz, Quantum Mechanics, Non-Relativistic Theory, Vol. 3 of Course of Theoretical Physics.

5. J.J. Sakurai, Advanced Quantum Mechanics.

Evaluation of Performance:

The course grade will be based on the homework assignments, one mid-term exam and the final exam. There will be several homework sets of about five problems each. Every student should attempt to solve all problems. The homework will be accepted and graded only if written in a neat and orderly fashion, and if the answers are justified by showing the complete work. Discussions of the problems among students are strongly encouraged, but each student should write out and turn in his/her own solutions. It is important that everybody attempts the problems before asking a colleague or the instructor how to do it. Identical copies of the same homework will not be accepted. The mid-term exam and the final exam will be based (although not exclusively) on the homework problems. Hence, it is important to solve all the homework problems. The homework performance contributes with 35%, the mid-term exam with 30%, and also the final exam with 35% to the course grade. The grade dividing lines are subject to adjustments at the end of the course. Tentatively the required score for A and A- is at least 88%, the dividing line between B- and C+ is 70%, the C range is between 50% and 70%, and scores less than 50% correspond to D or F.

ADA Statement:

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center (SDRC), and (b) bring a letter to the instructor from SDRC indicating your needed academic accommodation. Please do this during the first week of class. Honor Code Students are expected to uphold the Academic Honor Code published in the Florida State University Bulletin and the Student Handbook. The Academic Honor System of Florida State University is based on the premise that each student has the responsibility to (1) uphold the highest standards of academic integrity in the students own work, (2) refuse to tolerate violations of academic integrity in the university community, and (3) foster a high sense of integrity and social responsibility on the part of the university community.