2016 Fall Semester

424 Physics
“Quantum Mechanics II”

Instructor: Prof. Slava V. Rotkin
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610-758-3904; Office: Lewis 414
Class: 9:20 am - 10:35 am TR Lewis 511

Prerequisites: PHY 369 (or equivalent course in quantum physics) and its prerequisites.
Credits: 3
Grades will be based on

- midterm exam (25%),
- homework and quiz (20%)
- textbook reading assignments and class/discussion activity (15%)
- final exam (40%)

Expectations:
You should expect to spend at least an hour of outside class study for every hour in class in addition to approximately an hour doing a homework assignment. Many students find it helpful to form study groups to work and discuss homework assignments with other students which is encouraged. It is an excellent way to learn physics. However, it is expected that finally each student will know how to work his problem for quiz, midterm or final without help. If you get stuck on a homework problem, see your instructor for help.
Office hours: TR 1:15 - 2:30 (schedule the meeting)

Textbook: "Quantum Mechanics with Basic Field Theory" by Bipin R. Desai, Cambridge University Press; (2009) # ISBN-10: 0521877601 # ISBN-13: 978-0521877602

Recommended reading:

- **L. D. Landau and E. M. Lifshitz, *Quantum Mechanics (Non-Relativistic Theory)***
- J.J. Sakurai: Modern Quantum Mechanics, Addison-Wesley (1994)
- A. Messiah, Quantum Mechanics
- L. I. Schiff, Quantum Mechanics
- Eugen Merzbacher: Quantum Mechanics, (3rd edition), Wiley, 1998.
- W. Thirring: Course in Theoretical Physics 3: Quantum Mechanics of Atoms and Molecules, Springer-Verlag (1990)
- D. Bohm: Quantum Mechanics; Foundations and Applications, 3rd edition, Springer-Verlag (1994)

Accommodations for Students with Disabilities: If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, Williams Hall, Suite 301 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.
The Principles of Our Equitable Community: Lehigh University endorses The Principles of Our Equitable Community [http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity_Sheet_v2_032212.pdf]. We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

Course Syllabus

0. Basics of Quantum Mechanics. Dynamical equations. Perturbation theory

Preliminary reading assignment: Refresh your memories on fundamentals of matrix QM (Ch. 1-13).

(Time evolution operator, Schrödinger, Heisenberg and interaction picture. Two-level system: time-independent and time-dependent problems. Perturbation theory: time-independent perturbation.)

Part I. Solving time-dependent problems of quantum mechanics

Part II. Scattering in quantum mechanics