

Physics 438b, Fall 2015
Part-II of undergraduate level QM at USC
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http://physics.usc.edu/~bars
Homework: questions and answers

Class times: Tu,Th 10:00-11:50 AM at KAP-134

Office hours: SSC-216B, Tu,Th 1:00 - 2:00 PM, or email for appointment.

Course Website: <http://physics.usc.edu/~bars/438b/>

Grader: Albin James, SSC-216A, email: albinjam@usc.edu

Pre-requisites

Part-I of undergraduate Quantum Mechanics, e.g. Phys.438a, including the following topics:

- Concepts of the quantum, Schrodinger equation, energy eigenstates, time evolution
- Dirac's notation for states and operators
- Solving one dimensional problems for bound states and scattering
- Schrodinger equation in 3 dimensions
- Orbital and spin angular momentum
- Harmonic oscillator and Hydrogen atom in 3 dimensions

Recommended Books

D. Griffiths, Introduction to Quantum Mechanics, 2nd edition

I. Bars, Quantum Mechanics (book provided online, see the [contents](#))

Grading (See: [The Trojan Integrity Guide](#) , [Guide for Avoiding Plagiarism](#) and [Appendix A](#))

20% homework, due on Thursdays the week after the HW is assigned.

25%+25% two midterm exams (closed book, Tu. Sept. 5, and Tu. Nov. 3)

30% final exam (closed book, Th. Dec. 10, 11:00 AM – 1:00 PM)

Course content and goals:

The topics of the lectures will correspond roughly to the second part of the textbook by D. Griffiths or the equivalent material (at a more advanced level) in Chapters 7,10-14 in the textbook by I. Bars. Problem solving will be emphasized with extensive homework. The covered material includes:

- Review of Angular Momentum, Addition of angular momentum
- Time independent perturbation theory
- Applications to the fine structure of the Hydrogen atom and other cases
- Variational approach with applications, including the Helium atom
- WKB approximation with applications, including alpha decay
- Time dependent problems and perturbative approximations
- Scattering theory in 3 dimensions, and approximations
- Special topics. Time may not permit to cover all the topics. In that case a selection will be made among the topics that are close to the end of this list.