

PHY405: Advanced Quantum Mechanics

Instructor: Professor V. J. Goldman, office: B-137
office hours: MoWeFr 9:30 - 10:30 am
email: Vladimir.Goldman@StonyBrook.edu

TA: Yashvinder Singh, yashvinder.singh@stonybrook.edu
office hours: TBA

Text: D. J. Griffiths, Introduction to Quantum Mechanics, 2nd or 3rd edition

Course organization and grading:

- Three lectures per week (Melville W4540, MoWeFr 8:25 - 9:20 am)
- Homeworks posted on BS on Fridays, due next week Friday on BrightSpace by 11:59 pm
- Late HW penalty: 20% per day, so that model solutions can be posted promptly
- Exams: two Midterms (Oct 4, Nov 13 in class) and Final (Wed, Dec 18, 8:00 - 10:30 am)
- Exams are open book; the Final is comprehensive
- Course grade = 20% HW + 20% each Midterm + 40% Final
- There is no provision for doing extra or outside work to improve your grade

BrightSpace: *syllabus*, *assignments*: HWs, solutions, exams, etc.

Course outline (continues PHY 308):

1. Time-independent perturbation theory: fine structure of H-atom, Zeeman and Stark effects
2. Variational methods: He atom, H₂ molecule ion
3. WKB (semiclassical) approximation: bound states, tunneling, radioactive nuclei
4. Time-dependent perturbation theory: two level systems, emission and absorption of electromagnetic radiation by atoms
5. The adiabatic theorem, geometric phase, Aharonov-Bohm effect
6. Quantum measurement "paradoxes"

Material will be presented primarily in lectures, readings assignments from the text, and homework problems. Lecture will cover the material to be learned, some important examples, and will direct your study from the text, however some material will be presented in class that is not in the text. Generally, students who attend the lecture do better on exams, and have better overall class experience. Thus, you should attend class, pay attention while there, and take notes over the material. You should plan on 2-3 hours of study and doing problems outside of class for every lecture.

Working together: Students are encouraged to study in small groups, discuss the material and HW problems. It should be perfectly clear that each person is responsible for completing and submitting the work. It is NOT acceptable to divide the problems, when one solves problem 1 and the other problem 2. Exchange of any information between the students during an exam is unacceptable.

Note: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Services. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/policies_expectations/min_instructional_student_resp.php