Syllabus Version 0
Physics 2566 Mechanics Spring 2019 (10158)

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Lectures: Allen Hall 106, Monday, Wednesday, Friday, 11:00-11:50 PM

Physics 2565 is first-year graduate level course in non-relativistic quantum mechanics. The textbook for the course is Sakurai & Napolitano, *Modern Quantum Mechanics*, second edition, which is available from the bookstore. The second term of this course applies the previously developed ideas and techniques of quantum mechanics to more complicated systems. Time-independent and -dependent perturbation theories are developed and applied. Formal scattering theory and approximation methods are presented. Applications are expected to include the interaction of electromagnetic radiation with matter; resonance scattering and bound states; identical particles and an introduction to introduction to second quantization; and if time and other considerations permit, a brief introduction to relativistic quantum mechanics.

The course grade is based upon in-class tests (generally, one corresponding to each chapter that we cover) and on the final exam. As a reminder, for graduate students in the physics & astronomy department, final examinations in core courses constitute the comprehensive exam and must be passed with a minimum score of 60%.

Homework is assigned each week. It is neither corrected nor graded. Solutions for the exercises in Sakurai & Napolitano are on-line (that's part of the reason it's not graded), and I in addition I post my own solutions to courseweb. Instead of giving credit for the homework, I give instead this advice:

- Make an honest effort to solve every problem. Write up the solutions and keep them in a notebook. Some of your solutions will be needed later in other problems.
- Feel free to discuss the exercises with your fellow students and solve them together. It's a great way to learn.
- *Do not look at an online solution* until after you are done and confident of a correct answer. Really. If you are stuck come and discuss it with your fellow students or with me.
- Cherish the time you spend late at night exploring every blind alley before you finally find the correct approach. This is the most useful part problem-solving, and exactly the part that you won't get if you use the solution manual as a crutch.
- The small amount of credit that most instructors assign for problem sets was never the principal benefit of problem solving, anyway, it was just the incentive given by instructors. Nowadays there are too many online shortcuts and that incentive doesn't work anymore. So, you will have to be motivated instead by the actual benefit of solving the assigned problems.

I'm always happy to discuss the homework problems with students, either before or even after you have found a solution.

Courseweb is used for announcements, homework solutions, and dissemination of any additional materials.

Reserve Books: The following books on quantum mechanics are placed on reserve in the Engineering Library (Benedum Hall):

- *Modern Quantum Mechanics,* J.J. Sakurai and Jim Napolitano, 2nd edition. (Textbook for the course.)
- *Quantum Mechanics*, vol. 1 and 2; or, bound together in a single edition, Albert Messiah
- *Introductory Quantum Mechanics*, Richard Liboff
- *Quantum Mechanics: Fundamentals*, K. Gottfried and T-M Yan.
- *Quantum Mechanics*, L. I. Shiff
- *Quantum Mechanics: Nonrelativistic Theory*, Landau and Lifshitz
- *Angular Momentum in Quantum Mechanics*, A. R. Edmonds.

You may also need to consult a good advanced text on classical mechanics from time to time:

- *Classical Mechanics*, Herbert Goldstein, Charles Poole and John Safko

Students with disabilities: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 216 William Pitt Union, (412) 648-7890/(412) 383-7355 (TTY), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course. A comprehensive description of the services of that office can be obtained at www.drs.pitt.edu

Academic Integrity: Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, from the February 1974 Senate Committee on Tenure and Academic Freedom reported to the Senate Council, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz or exam will be imposed.