SYLLABUS P2565
Non-relativistic Quantum Mechanics 1

August 25, 2014

COURSE AND INSTRUCTOR INFORMATION

TERM	2151
CATALOG NBR.	PHYS 2565
CLASS NBR:	10502
INSTRUCTOR:	David Jasnow
OFFICE:	216 Allen Hall
EMAIL:	jasnow@pitt.edu
PHONE:	412-624-9029
LECTURES:	MWF 11:00 – 11:50am 106 Allen Hall (subject to modification)

OFFICE HOURS: Mondays, 3:00 pm, and by appointment. If you come to my office any time, I will try to help, or, if I am engaged, we can set up a time to meet.

BRIEF COURSE DESCRIPTION

Every professional physicist should be able to use quantum mechanics, and, it is hoped, develop some appreciation of the nature of quantum mechanics. Recently there have been exciting developments involving quantum systems, and in some contexts one speaks rather of "quantum physics" as designating a wider subject matter overall. (Nonetheless, even recent textbooks tend to retain the title "Quantum Mechanics.") We have seen a recognized subfield develop, "quantum information", which recognizes the intersection of the ideas of quantum mechanics with information theory and computation. This course (and the continuation) will provide the theoretical and operational basis to enable venturing off into these modern areas as well as virtually all areas of current activity in physics and astronomy.

This course is the first of a two-term introductory sequence on non-relativistic quantum mechanics. Topics to be covered in the first term include: the general principles of quantum mechanics, potential problems, angular momentum, time-dependent and time-independent perturbation theory, potential scattering. Examples will include band theory of solids, emerging from discrete translational symmetry, and ubiquitous two-level systems. The Dirac equation will be briefly introduced in the second term of the sequence, but the emphasis of the entire sequence is non-relativistic quantum mechanics.

PREREQUISITES:

This course is a graduate level core course. Basic knowledge of quantum mechanics at the undergraduate level is required. Please consult with your academic advisor to ensure that you are properly enrolled in this course.

RECOMMENDED TEXTS:

There are a number of good books on quantum mechanics and some great classics. I will be using a number of sources to select lecture topics, but virtually all will be covered in the following, which is a recommended text for the course:

Gordon Baym, *Lectures on Quantum Mechanics.* This is an excellent text for virtually all aspects of quantum mechanics. The material is all there, but one may have to search for it.

There are a number of good books (in addition to Baym's book) that will be held on reserve in the

Engineering Library in Benedum Hall. Readings will be suggested as the lectures progress. Please let me know if you would like me to request additions to the list. Some of the reserve items will be:

1. V. Zelevinsky, *Quantum Physics v1 and v2*. This set has all the material and will serve as a good reference.
2. J. J. Sakurai, *Modern Quantum Mechanics.* Also an excellent text on quantum mechanics; the second volume will be needed for the second term.
3. E. Merzbacher, *Quantum Mechanics.* A classic.
4. P J E Peebles, *Quantum Mechanics.* A very down-to-earth book getting lots of material in without being overly formal.

Others may be added during the term.

GRADING: There will be regular homework assignments. I don't mind if you work together on the problems, but each student must turn in an independently prepared problem set.

The final grade will be determined by performance on the homework assignments, a midterm exam and final exam (both required). The relative weightings for the **course grade** will be approximately: HW 35%; Midterm 25%; Final Exam 40%. Performance on the final exam plays a role in determining your grade on the department's comprehensive exam.

DISABILITIES: (Office of the Provost, July 25, 2014) ***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 (DRS), 140 William Pitt Union,*** **(412)** ***648-7890, drsrecep@pitt.edu,*** **(412)228-5347** ***for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.***

If you will be requesting an accommodation, please contact DRS and the instructor during the first two weeks of the term.

CourseWeb: There is additional material on CourseWeb relating to syllabus, assignments and hints, announcements, academic integrity, disabilities, and so on. Please make sure you have access to CourseWeb (for example, through my.pitt.edu), and look over the available materials, particularly the "Academic Policies" link under "Syllabus" at your earliest convenience.