Phys 622—**Introduction to Quantum Mechanics I**—Spring 1998

Time and place: MF 12:00-12:50, W11-12:50 Room 1402
Instructor: Dr. Ted Jacobson
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Office hours: by appointment

Course content: This is the first semester of a graduate quantum mechanics course. The textbook is by F. Schwabl (see below). The material covered will correspond roughly to the content of Chapters 1-9, 13.1, 17, 20. The order of the topics and some of the content will differ from the text.

Textbook: *Quantum Mechanics*, 2nd edition, by F. Schwabl, (Springer-Verlag, 1995). Problems and reading will be assigned from this book.

Reserve books: The books by Schwabl, Landau-Lifshitz, Baym, and Sakurai are on reserve at EPSL under Phys 623, Prof. V. Yakovenko.

E-mail: I encourage students to make use of e-mail for quick correspondence with me regarding lecture material, homework problems, or whatever. I will sometimes send copies of this correspondence (without identifying the student) to the class e-mail list if it seems useful. I will also use e-mail to communicate with the class at large.

Homework: Assigned weekly and due the following week. Late homework accepted only under dire circumstances. If you know it will be impossible to turn in an assignment on time you must discuss this with me *in advance* of the due date. The homework is an essential part of the course. I believe most of what you learn will come from doing the homework. You are encouraged to discuss the homework with others, but what you finally hand in should be your own work. *Sources (e.g. textbooks) should be cited when used heavily in a homework solution.* **Please make sure you include your name and the homework and course numbers and staple the pages together.**

Exams: One mid-term and a final. The official time for the final is Thursday, May 21, 8:00am-10:00am. I will try to change this.

Grading: Based on homework (30%), mid-term (30%), final (40%), with the best of these three raised by 20% and the worst lowered by 20%. I cannot say for sure in advance, but I expect the letter grades to correspond to (roughly) (A) 100-80%, (B) 80-60%, (C) 60-40%.

Other texts: There are many books out there. I have selected a few to mention here.

- L.D. Landau and E.M. Lifschitz, *Quantum Mechanics (Non-relativistic theory)*: Practical *and* fundamental, with many applications and worked problems.
- G. Baym, *Lectures on Quantum Mechanics*: Informal but sophisticated, very readable, with many applications.
- L.I. Schiff, *Quantum Mechanics*: A "standard" old-fashioned graduate textbook. Contains a lot of material and has a good table of contents.
- J.J. Sakurai, *Modern Quantum Mechanics*: Written by a high-energy theorist, tilted toward the algebraic approach. Nice choice of examples.
- H.A. Bethe and R. Jackiw, *Intermediate Quantum Mechanics*: Atomic structure, interaction with radiation, and scattering theory, beyond the usual introductory topics.
- R. Shankar, *Principles of Quantum Mechanics*: Holds the student's hand, verbose, mostly elementary, contains a bit of muddy thinking here and there, but has some very nice modern applications.
- D.J. Griffiths, *Introduction to Quantum Mechanics*: A very well written modern undergraduate text, neatly organized and lucid.
- P.A.M. Dirac, *Principles of Quantum Mechanics*: An elegant classic.
- R.P. Feynman, *The Feynman Lectures on Physics, vol. III*: A "beginning undergraduate" text offering insights that keep professors coming back.
- A. Messiah, *Quantum Mechanics*: Strong on the formal and mathematical aspects of the theory.
- M. Abramowitz and I. Stegun, *Handbook of Mathematical Functions*: Indispensible for special functions.
- Gradstein and Rhyzik: *Table of Integrals and Series*: The best.