Physics 216 **Non-Relativistic Quantum Mechanics II** **Spring 2012**

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Office Hours:	Mondays 2–4 pm

COURSE WEB PAGE:

`http://scipp.ucsc.edu/~haber/ph216/`

CLASS HOURS:

Lectures: Tuesdays and Thursdays, 12:00–1:45 pm, ISB 235

REQUIRED TEXTBOOKS:

Principles of Quantum Mechanics, 2nd Edition, by Ramamurti Shankar

Lectures On Quantum Mechanics, by Gordon Baym

SUGGESTED OUTSIDE READING:

Modern Quantum Mechanics, 2nd Edition, by J.J. Sakurai and Jim Napolitano

Quantum Mechanics, by Ernest S. Abers

Quantum Mechanics, Volumes 1 and 2, by Claude Cohen-Tannoudji, Bernard Diu and Franck Laloë

Quantum Mechanics, 3rd Edition, by Eugen Merzbacher

Quantum Mechanics (Non-relativistic Theory), by L.D. Landau and E.M. Lifshitz

Quantum Mechanics: Fundamentals, by Kurt Gottfried and Tung-Mow Yan

Quantum Mechanics, 4th Edition, by Frank Schwabl

Advanced Quantum Mechanics, 4th Edition, by Frank Schwabl

Quantum Mechanics, by Gennaro Auletta, Mauro Fortunato and Giorgio Parisi

Quantum Mechanics: A New Introduction, by Kenichi Konishi and Giampiero Paffuti

PREREQUISITES:

It is assumed that you are familiar with the material covered in Shankar's textbook, chapters 1, 4–6, 7, 9, 11–14, 15.1 and 15.2; and in Baym's textbook, chapters 3–7, 14, and 15.

Advanced Topics in Non-Relativistic Quantum Mechanics

Course Outline for Physics 216

Topics	Readings
1. Advanced topics in angular momentum theory	Shankar, section 15.3; Baym, chapter 17
2. Path Integral Formulation of Quantum Theory	Shankar, chapter 8
3. The WKB Approximation	Shankar, section 16.2
4. The Variational Method	Shankar, section 16.1
5. Time-independent Perturbation Theory	Shankar, chapter 17; Baym, chapter 11
6. Quantum Theory of Scattering	Shankar, chapter 19; Baym, chapters 9–10
7. Time-dependent Perturbation Theory	Shankar, sections 18.1–18.3; Baym, chapter 12
8. Quantum Theory of Radiation	Shankar, section 18.5; Baym chapter 13
9. Identical particles	Shankar, chapter 10; Baym, chapter 18
10. Second quantization	Baym, chapter 19

Course Grading and Requirements

45% Homework (5 problem sets)
20% Midterm Exam (take-home exam; Thursday May 10–Friday May 11, 2012, due at 6 pm)
35% Final Exam (Wednesday June 13, 2012, 8–11 am)

Homework assignments are *not* optional. Homework assignments will be due on every second Thursday of the academic quarter, with the exception of the first assignment, which is due on Tuesday April 17, 2010. The homework problem sets are not optional. You are encouraged to discuss the class material and homework problems with your classmates and to work in groups, but all submitted problems should represent your own work and understanding.

The midterm exam will be a take-home exam handed out in class on Thursday May 10 and due at the end of the following day. The final exam will be open book/open notes in-class exam that will be held in the same classroom as the lectures. You will be permitted to consult Shankar and Baym, your class notes, and any class handout. The midterm exam will cover the course material addressed by the first three problem sets, and the final exam will cover the complete course material. You must take the final exam to pass the course.