

PHY 7410 – Quantum Mechanics II – Syllabus

Semester: Winter 2006

Lecturer:

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Lecture Time/Room:

Lecture **Monday, Wednesday, Friday 12.50-1.45 pm**, 185 Physics Building

Suggested Texts:

L. Landau and E. Lifshits, **Quantum Mechanics**, (Butterworth-Heinemann Ltd).
E. Merzbacher, **Quantum Mechanics**, (3rd edition, John Wiley & Sons, Inc.);
J. J. Sakurai, **Modern Quantum Mechanics**, (Addison-Wesley Publ. Company);

Office Hours: by appointment.

Grading:

Your course grade will be determined by your performance in homework assignments, one midterm exam and a Final Exam on the basis of the following distribution.

Homework Projects (typically every 10 days)	30%
Midterm Exam	30%
Final Exam	40%

The completed homework assignments are due at 5 pm on the date specified; typically 10 days after the assignment is given. Late submissions will not be accepted.

Course description and objectives:

This course is a continuation of PHY 7400, an introduction to methods of quantum mechanics, including Schrödinger equation and its solutions as applied to simple physical problems, elementary approximate methods, and scattering theory.

Topics to be covered (approximate):

1. **Variational method and perturbation theory.** Non-degenerate and degenerate perturbation theory. Boundary conditions as perturbation. Variational methods.
2. **Spin.** Introduction to spin. Identical particles. Exchange interaction.
3. **Scattering.** The cross-section. The Green's functions. Partial waves and phase shifts. S-matrix.
4. **Bound states.** Inelastic scattering. Lippmann-Schwinger equation. Shallow bound states. Deuteron.
5. **Quantum dynamics.** Time development operator. Path integrals in quantum mechanics. Perturbation theory and diagram techniques.
6. **Relativistic quantum mechanics.** Introduction to Klein-Gordon and Dirac equations.
7. **Additional topics.**

Grading:

The overall course grade will be determined on the basis of the following grading curve:

Grade	Cumulated Score	Grade	Cumulated Score
A	85-100	C	60-64
A-	80-84	C-	55-59
B	75-79	D	45-49
B-	70-74	D-	40-44
C+	65-69	E	0-39

Website: <http://www.physics.wayne.edu/~apetrov/PHY7410/>