

Instructor:

Dr. Andrew Blechman, 260 Physics Building
Email: blechman@wayne.edu
Office hours: T Th 5:30pm – 6:30pm (after class)

Lecture time and location:

T Th 4:00pm – 5:15pm, 177 Physics Building

Prerequisite:

PHY 6400 (Quantum Physics I)

Textbook:

Introduction to Quantum Mechanics, 2nd Edition, by D. J. Griffiths.

Supplementary/References:

Principles of Quantum Mechanics, 2nd Edition, by R. Shankar.
A Modern Approach to Quantum Mechanics, 2nd Edition, by J. S. Townsend.
Quantum Mechanics, 2nd Edition, by B.H. Bransden and C.J. Joachain.
Modern Quantum Mechanics, by J.J. Sakurai and J.J. Napolitano [more advanced].

Learning Outcomes:

This course is a continuation of PHY 6400 as an intermediate study of Quantum Mechanics. You should be familiar with the principle ideas behind the Quantum Theory, described in roughly the first four chapters of Griffiths. I am also assuming that you have a solid grounding in mathematics and other aspects of physics (especially E&M).

The principle goal of this semester is to explore the application of Quantum Mechanics to “real-world” problems. Topics that will come up include:

- Matrix Mechanics approach to Quantum Mechanics, especially in relation to spin and angular momentum problems.
- The use of approximation methods such as perturbation theory, variational methods and the WKB Approximation to analyze problems with no exact solution available.
- Chemical phenomenology: including a semi-complete analysis of Hydrogen and applying it to other elements in the periodic table; learning how covalent and metallic bonding occurs; and an elementary discussion of the physics of the solid state.
- Scattering Theory in three dimensions.
- Quantum dynamics: including transitions between states; absorption and emission of radiation; and selection rules.
- *If time permits*: a discussion of how (special) relativity fits into the picture, and how things change.

Homework:

Homework assignments are the most important tool you have in learning the material. There will be roughly one assignment each week worth 25 points, with 12 assignments in all (totaling 300 points). These assignments will ask you to fill in various gaps in the lecture and reading, and also work on independent problems based on the material in lecture and the book.

The assignments will be posted on the Blackboard course website after Thursday’s lecture. These assignments must be submitted electronically to my email and will be due by **12:00PM on Friday** (one week after the assignment was posted). For every hour that it is late (set by the time-

stamp on your email), you will lose 0.5 points. I would like to recommend “Rocketbook Everlast” Notebook for posting your assignments (but you are not at all obligated to use it). Check it out at <http://everlast.getrocketbook.com> (also available on Amazon).

You must show your own work and solution steps to receive credit, although group discussions are allowed. Also: I have to be able to read your handwriting, so be careful! Copying from other sources (e.g.: from other students, internet, or elsewhere) is prohibited and will be given 0 credit.

Exams:

There will be two exams to be announced at least 1 week in advance (NO make-up exams). The Final Exam is cumulative and is scheduled for **Tuesday, December 19 at 2:45pm – 4:45pm**, although that might change (stay tuned).

Grading:

1st exam: 20%
2nd exam: 20%
Final exam: 30%
Homework: 30%

Video Lectures

Occasionally, I will be unable to be present for class. In these instances, class will *not* be cancelled, but instead I will post a video lecture on the Blackboard course page. You will be expected to watch the video lecture on your own time, and are still responsible for all the material. I will give you advanced warning of each lecture that will be delivered in this way.

Additional Resources and Help

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services’ mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.