

Course Syllabus

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Description: Second semester of a two-semester senior course. Review of atomic and other quantum phenomena and special relativity; introduction to quantum mechanics treating the more advanced topics of atomic physics and applications to molecular, solid state, nuclear, and elementary particle physics and quantum statistics. Experiments underlying this course are covered in Physics 407.

Prerequisites: [Physics 448](http://www.physics.wisc.edu/undergrads/course-reference/fall2011/205/) (<http://www.physics.wisc.edu/undergrads/course-reference/fall2011/205/>). If you did poorly in 448, you should come see me and discuss strategy for improvement in 449. Students with a D in 448 should see their advisor as well.

Instructor: Thad Walker, 5322 Chamberlin, 262-4093, tgwalker@wisc.edu (<mailto:tgwalker@wisc.edu>)

Lectures: MWF 9:55, CHAMBERLIN 2223

Office Hours: 5322 Chamberlin M-F 8:30-9:30 am

I strongly encourage you to take advantage of my office hours. Some days I may not be available. If you come by during office hours and I am not there, leave a note under the door and send me an email. I will make every effort to meet with you at the first opportunity.

Texts: *A Modern Approach to Quantum Mechanics* by Townsend. This will be periodically supplemented by notes posted on the course page.

I intend to roughly follow the text, but you should expect significantly different perspectives to be discussed and presented in the lectures. Here's a quote from a recent student evaluation: "Also, if you only have good lectures to learn from, and you miss class, then it is a significant problem". I agree.

Required supplemental material: *Mathematica*. Mathematica is a particularly powerful tool for algebra, simulation, and graphics. I encourage you to use it for your homework and there will be some work that will be required to do using Mathematica. Other work will often be *much* easier done with Mathematica than by hand. Mathematica is available for free from the Campus Software Library, and is also available for your limited free use on the physics library computers, in the [physics club](http://ups.physics.wisc.edu/drupal/) (<http://ups.physics.wisc.edu/drupal/>) room, and in the [Garage Physics](https://wiki.physics.wisc.edu/garage) (<https://wiki.physics.wisc.edu/garage>) room.

One of my goals is computer literacy. Computation is an important skill for any scientist to master.

Grading Scale: The final grade will be determined from a weighting of the four components listed below. The total homework score and each of the exam scores will be curved to a

80%(A)

70%(AB)

60%(B)

50%(BC)

40%(C)

20%(D)

scale before a final grade judgement is made. Scores will be posted on the course Canvas page. Note: the primary function of the Canvas gradebook is to make sure your scores are accurately entered. Any averaging information presented there is unofficial.

Homework: 20% of grade. Homework assignments will typically be due on Friday afternoons at 5:00, turned into the 448 slot next to Rennenbaum auditorium outside 2103 Chamberlin. Late homework does not exist. Just do it. The lowest homework score will be dropped. Each homework problem is worth 0-3 points and will be graded according to the following scale:

- 0:Blank/Garbage/Too Messy to grade
- 1:Tried but little progress
- 2:On the right path but significant errors
- 3:Correct or only minor errors

Historically, students who neglect their homework are at the greatest risk for low exam scores. I strongly urge you to work together in small groups, but the work you hand in should be your own. My solutions will be posted on the web page.

Project: At some point in the semester, a project will be announced, worth 25%.

Exams: Mid-term, 25% of grade, likely March 10ish. Specific date will be announced in class.

Comprehensive Final, 30% of grade,

<http://students.wisc.edu/doso/acadintegrity.html>

Academic Misconduct: <http://students.wisc.edu/doso/acadintegrity.html>

In-class exams: you are allowed to bring one sheet of notebook paper. Calculators are permitted, but no devices that can access the internet.

Take-home exams: you are allowed to use any books, internet, Mathematica--any non-human resource to solve the problems. As with any of your work, if you use an outside source you are required to properly cite it. If you modify a homework solution, even your own, you must identify that as well. This is important because your homework solutions will often be quite similar to each other due to working together. You are explicitly *not allowed* to discuss any aspect of the exam with any other human being using any form of communication. This includes sharing information about what resources to use.

Consequences: academic misconduct will result at a minimum with a 0 for the exam with greater punishments given at the instructor's discretion.

Schedule: We will cover Chapters 9-14 of Townsend, plus additional material as needed.


Classroom Environment: Quantum Mechanics is the basic language of modern physics. There will be many new ideas to consider. I want and need you to interact with me in the classroom. Come ready to participate. Another student evaluation quote: *"He strongly encouraged questions, and once we caught on to just how receptive he was, we really capitalized and it greatly enhanced the class."*

Attendance: I expect regular classroom attendance by all students.

Official Syllabus (BETA)

 [Official Syllabus \(Beta\)](#)

Course Summary:

Date	Details
Fri Feb 2, 2018	 HW01 (https://canvas.wisc.edu/courses/85991/assignments/265962) due by 4:59pm