Instructor

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Office Hours: Tue. 11 am – 12 pm and Fri. 12 – 2 pm

In addition to these office hours, you are welcome to come to my office any time I am in, or you can make an appointment by phoning or emailing me.

Course Overview

This course is the second semester of the undergraduate Quantum Mechanics sequence. We will use the same text as Phys 31a (Introduction to Quantum Mechanics by Griffiths and Schroeter) and will cover roughly Chapters 6 - 11. There will be weekly reading assignments, and you are expected to do before the class in which we discuss the material.

The topics to be covered are

- Symmetry and conservation laws, including review of some aspects of the formalism of quantum mechanics and of angular momentum.
- Time-independent perturbation theory with particular applications to corrections to the energy levels of the hydrogen atom.
- Use of the variational principle to understand multi-body systems, such as the helium atom and the hydrogen molecule.
- WKB approximation.
- Time dependent problems, including time dependent perturbation theory and emission and absorption of radiation.

Success in this 4 credit hour course is based on the expectation that students will spend a minimum of 9 hours of study time per week in preparation for class (readings, homework, discussion sections, preparation for exams, etc.).
Latte

I will use Latte to post everything for this course. This includes reading assignments, homework assignments, solutions to assignments, scores on assignments and exams, and extra material.

Grading

Your grade will be based on homework scores, two midterm exams, and a final. I will calculate a weighted score for the course (30% for homework, 20% for each midterm exam, and 30% for the final exam) and assign grades based on your score. I will nominally aim for a class grade point average that is in keeping with average university grades taking into account that this is an advanced Physics course. If I think the class did better or worse than expected, I will adjust the GPA.

As you can see from the weights, I think homework is important. I strongly encourage you to work with your fellow students on problem sets, keeping in mind that you must understand things for yourself. Since I expect students to work together, I expect to get similar solutions to problems, but you must write up your solutions yourself, that is, no photocopying or direct copying of someone else’s work.

If a plot of a function or data is requested in a problem, this must be a computer-generated plot (not hand drawn). This can be done with MATLAB, Mathematica, Excel, or any of a number of other programs. If anyone would like help with one of these, please come see me. The axes of the plot must be clearly labelled with the quantity plotted and any relevant units.

Each homework assignment will have a due date, usually a week after it is given out. Homework will be considered late if I receive it after the solutions are posted, which could be any time after 4:00 pm on the due date. Late homework will be graded and will receive 50% of score it otherwise would have received. You may turn in partial homework sets. Thus, if there is a problem that you just can’t get, you can turn in everything else on time and then turn in the troublesome problem after viewing the solutions. As with working with your fellow students, you must write your solutions, that is, read and understand the solution and then write it in your own way. If you are having difficulty with a problem, you should talk to your classmates and/or me.

As with most physics classes, the material is very cumulative, that is, understanding the later material requires you to understand and retain the earlier material. Thus, I very strongly recommend that you DO NOT fall behind in your work in this course.

The midterms will during the scheduled class time, and the final will be during the
final exam period. The exams will be closed book and closed notes. However, for each exam, you may bring one $8\frac{1}{2} \times 11$ sheet of paper with anything written on it you like (both sides). No electronic devices may be used during the exams, including calculators, cell phones, MP3 players, and computers.

Text

The required text for this course is *Introduction to Quantum Mechanics* (3rd edition) by David J. Griffiths and Darrell F. Schroeter.

I also highly recommend the mathematical physics book *Mathematical Methods in the Physical Sciences* (3rd edition) by Mary L. Boas. It is a valuable resource for many areas of math useful to physicists, including several that we will learn about in this course. Several recent physics graduates have said that it is a very helpful reference to have. We will not be using it directly, but I will point out sections of it that are relevant to the course.

Additional meeting hour

We will arrange for an hour during the week for make-up lectures and to discuss topics as a group as needed.

Prerequisites

You should have taken Phys 31a (and its prerequisites) or something equivalent. If you have any questions about your preparation for this course, let me know and we will discuss it.

Schedule

This class meets TF 9:30 to 10:50 am. The exceptions to the usual class meeting times are:

- Oct. 1, Rosh Hashanah
- Oct. 15, Brandeis Monday
- Nov. 29, Thanksgiving break
The dates of the midterms are to be determined. The final will be a three hour exam during the regularly scheduled time for this block (Block G) during the final exam period. As of yet, there is not even a tentative time for this final.

Documented Disabilities

Brandeis seeks to welcome and include all students. If you are a student who needs accommodations as outlined in an accommodations letter, please talk with me and present your letter of accommodation as soon as you can. I want to support you.

In order to provide test accommodations, I need the letter more than 48 hours in advance. I want to provide your accommodations, but cannot do so retroactively. If you have questions about documenting a disability or requesting accommodations, please contact Student Accessibility Support (SAS) at 781.736.3470 or access@brandeis.edu.