# Additional course information (exams, problem sets, grading, textbook etc.).

Textbooks: *Introduction to Quantum Physics* by D. J. Griffiths, 3rd edition is the required textbook. See Griffiths' **webpage (http://www.reed.edu/physics/faculty/griffiths.html)** at Reed College for a warning about international paperback versions of the textbook, and for a list of corrections. If you have access to a copy of the second edition, it will also do. Two other textbooks that you may find useful are Sakurai, *Modern Quantum Mechanics*, and the two volume series *Quantum Mechanics* by Cohen-Tannoudji, Dui and Laloe. These have both been placed on reserve in the Math library.

Additional readings will be posted on the course web page as necessary.

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Prerequisites: Completion of a previous quantum mechanics class such as PHYS 3316. I will assume that you are familiar with the Hydrogen atom and the quantum harmonic oscillator. We will make use of linear algebra, differential equations, complex numbers and Fourier transforms.

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Problem Sets: There will be one problem set each week to help you better learn the material and to prepare for exams. The problem sets will be posted as assignments on Canvas on Friday and are due in Canvas the following Friday by 11:59 pm. Solutions to the problem sets will be posted at the end of each week. The homework will be graded as follows: we will choose two problems and thoroughly grade them on a scale of 1-6. The remaining parts of the homework will be graded on effort only, for an additional 4 points maximum. However, you should not underestimate the importance to work on every problem as a means to learn course material. The lowest problem set grade will be dropped, so you can miss one problem set without penalty.

We encourage you to work in collaboration with your colleagues on the problems, however you should make a serious individual effort first. Although you are encouraged to work out the solutions to problems together with other students, consult textbooks, or get advice from your TA you are required to write up the answers independently and in your own words. The final work should be yours (see more under *Academic Integrity*).

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Reading: Reading assignments will be included with each weekly problem set. These will be predominantly chapters from Griffiths, but will also include additional material that will be posted. The reading will consolidate the material that we discussed in lecture and make it easier to solve the problem set.

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Exams:

- Prelim: Tue, Mar. 28, 7:30 pm - 10:00 pm in Rockefeller 230 (scheduled for 2.5 hours, but the exam will be designed to be shorter than that)
- Final: May 13-20, time and location tbd

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Grading:

- Prelim 25%
- Final 35%
- Homework 40%

To encourage your active participation in the course, up to 5% of extra credit will be given for participation in the class and the section, and for engaging in discussions on Slack. Four classes and two sections will be dropped.

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Students with Disabilities: Your access in this course is important to me. Please request your accommodation letter early in the semester, or as soon as you become registered with SDS, so that we have adequate time to arrange your approved academic accommodations.

- Once SDS approves your accommodation letter, it will be emailed to both you and me. Please follow up with me to discuss the necessary logistics of your accommodations.
- If you are approved for exam accommodations, please consult with me at least two weeks before the scheduled exam date to confirm the testing arrangements.
- If you experience any access barriers in this course, such as with printed content, graphics, online materials, or any communication barriers; reach out to me or your SDS counselor right away.

- If you need an immediate accommodation, please speak with me after class (we can move into a separate zoom room) or send an email message to me and SDS at **sds_cu@cornell.edu (mailto:sds_cu@cornell.edu)** .

If you have, or think you may have a disability, please contact Student Disability Services for a confidential discussion: **sds_cu@cornell.edu (mailto:sds_cu@cornell.edu)** , 607-254-4545, **sds.cornell.edu (http://sds.cornell.edu)** .

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Religious Obligations: I will make every effort to accommodate all students who, because of religious obligations, have conflicts with scheduled exams, assignments, or other required attendance. Please notify within the first two weeks of the course about the scheduled conflict.

Course summary: This is an intermediate course on quantum mechanics geared towards physics majors.

I plan to cover the following topics:

- Formalism and mathematical basis of quantum mechanics
- The postulates of quantum mechanics
- 3D Schroedinger equation including the hydrogen atom with a focus on angular momentum.
- Symmetries and conservation laws in quantum mechanics
- Identical particles
- Approximation methods: Time-independent and time-dependent perturbation theory, variational principle
- Adiabatic processes and Berry's phase
- Solutions to Schrödinger Equation in 1D
- Scattering theory
- Quantum entanglement