# CORNELL UNIVERSITY

#### AEP 3620/5620

# **Intermediate Quantum Mechanics**

Spring 2025

**Course instructor** 

Kenji Yasuda 235 Clark Hall kenji.yasuda@cornell.edu

Office hours: Monday 5:00 PM-6:00 PM

Thursday 5:00 PM-6:00 PM

**Teaching Assistant** 

Yuxin Jiang 218 Clark Hall yj546@cornell.edu

Office hours: Friday 11:30 AM - 12:30 PM

Course secretary/registrar

Hannah Sue Peck 261 Clark Hall hsp38@cornell.edu

**Lectures** M/W/F 10:10-11:00 AM 247 Clark Hall

No lectures: February 26 (February Break) (March 7, Rockefeller 112)

Week of April 1 (Spring Break)

**Discussion** W 1:25-2:40 PM Physical Sciences Building 133

No discussion: Week of April 1 (Spring Break)

Course web site Go to the AEP 3620 site at https://canvas.cornell.edu/

Homework assignments and solutions will be posted.

### Goals of the course

- conceptual/qualitative understanding of quantum mechanics
- development of tools and recipes for doing real calculations
- introduction to some subjects that are in current research
- introduction to some technologically relevant subjects

#### **Contents**

- Brief Review: Harmonic oscillator (Ch. 2 in Griffiths)
- Central potentials, hydrogen atom (Ch. 4)
- Spin, addition of angular momenta (Ch. 4)
- Variational principle (Ch. 8)
- Time-independent perturbation theory (Ch. 7)
- Applications of perturbation theory (Ch. 7)
- Time-dependent perturbation theory (Ch. 11)
- Identical Particles (Ch. 5)

Prerequisite: AEP 3610 or PHYS 3316

Corequisite: AEP 4220 or permission of instructor

**Textbook** "Introduction to Quantum Mechanics" by David J. Griffiths, **3rd edition**.

**Lectures** Lectures are an important component of this course, and students will be responsible for the material presented in lectures.

We will use Poll Everywhere during the lecture. Please bookmark:

https://pollev.com/kenjiyasuda531

**Homework** Problem sets will be assigned approximately weekly and **due on Tuesday at 9am.** 

**Submit problem sets on Canvas.** 

A 24-hour grace period will be allowed for homework submission, i.e. submission by Wednesday at 9am, with a 15% penalty.

I will drop your lowest homework score for the semester. Please use it wisely.

If you want to request a regrade because of the mistake in the scoring, you must bring it

up with the TA within 1 week of the grades being posted.

**Exams** There will be three exams: two preliminary exams and a final exam. These exams will

cover material from lecture. Homework problems may appear on the exams.

Preliminary exam 1: Thursday, March 4, 7:30 PM, Physical Sciences Building 120 Preliminary exam 2: Thursday, April 10, 7:30 PM, Physical Sciences Building 120

Final: TBD by registrar later in the semester

**Grading** Problem sets: 20%

Prelim exam 1: 22.5% Prelim exam 2: 22.5% Final exam: 35%

#### Communication

All communication will be by email or through Canvas. If you email, in the subject line include both "AEP 3620/5620" and a short description of your question or issue. Keep your message short and to the point. We will respond as promptly as feasible.

## **Academic Integrity**

Students expected to abide by the Cornell University Code of Academic Integrity with work submitted for credit representing the student's own work. Discussion of homework assignments is permitted and encouraged, however, any work submitted for academic credit should be the student's own work. Course materials posted on Canvas are intellectual property belonging to the author. Students are not permitted to buy or sell any course materials without the express permission of the instructor. Such unauthorized behavior will constitute academic misconduct. Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com (or a similar page) for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

### **Exam conflicts and accommodations**

If you have an SDS accommodation or there is a conflict under Cornell policy (more than 3 exams in 48 hours or direct conflict) then it might be necessary to take an exam at a different time than the rest of the class. You are responsible for telling me more than a week before the exam that an accommodation is required.