Quantum Mechanics
Fall Quarter 2023
Physics 115A

Michael Mulhearn
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Physics 317

Lectures: M,W,F 9:00-9:50 AM in Roessler 55

Textbook: Intro. to Quantum Mechanics (3rd Ed.) by Griffiths and Schroeter
Lecture notes will be available on course website.

Course TAs:	Ben Eustis-Guthrie	(bmguthrie@ucdavis.edu)
	Umut Oktem	(ucoktem@ucdavis.edu)

Office Hours:	Mulhearn:	TBA
	Problem Solving Session:	TBA
	Eustis-Guthrie:	TBA
	Oktem:	TBA

Midterm Exam: 1.1-1.6,2-2.4 Date TBD (Aim for Nov 8)
Final Exam: Wed, December, 13 2023 6:00 PM in Roessler 55

Course Description:
Introduction to quantum mechanics. We will introduct the Schrödinger Equation and it's probabilistic interpretation. We will then hone our understanding and intuition with a series of examples: infite wells, harmonic oscillators, free particles, finite wells, delta function potentials, and the WKB approximation. Grounded by these examples, we will formalize our understanding of quantum mechanics with Hilberth Space, Observables, Uncertainty Principle, and introduce the powerful Dirac Notation.

Homework:
Homework and due dates will be posted on the course website. The best way to prepare for the exams is to solve problems yourself or by actively participating within a study group. Do not post homework problems to internet forums or use solutions found online. Always do you own work and be prepared to explain it.

Cheating:
Cheating is in the long run counterproductive, but I can understand that it is frustrating when it seems the cheaters are getting away with it in the short term. Therefore, this class will include some countermeasures against cheating. Most homework assignments will include practice problems which are graded by effort only. Anyone cheating on these problems would be risking getting caught for no benefit to their grade. For newly written problems, we will be monitoring the cheating websites to see if they begin to appear. If they do, we may implement additional countermeasures: such as looking for tells in the online solutions, or starting weekly homework quizzes, just to mention a few. The best safeguard against cheating is the midterm and final exam. If you do all your homework yourself, you should be well prepared for those exams.

Grades:
Final grades will be approximately 60% Homework, 20% Midterm Exam, and 20% Final Exam. Your worst homework score will be dropped.

Course Schedule:
Here is the anticipated schedule for the course. It may change as the course progresses. Attendance on Nov 22 (the day before Thanksgiving) will be worthwhile but optional. The pace will be about one section per lecture: brisk but doable. Please keep up with the reading even if the lectures fall behind.

Lectures:

Week	Dates	Topics	Reading
1	Sep 27,29	Wave Function, Schrondinger Equation	1.1-1.4, P1.14
		Momentum Operator	1.5
2	Oct 2,4,6	Uncertainty Principle	1.6, P1.7
		Stationary States, Infinite Square Well	2.1, 2.2
		Fourier Series	
3	Oct 9,11,13	Harmonic Oscillator	2.3
		Commutators	
4	Oct 16,18,20	Free Particle, Momentum Space	2.4
		Fourier Transform	
		Delta Function Potential	2.5
5	Oct 30, Nov 1,3	Finite Square Well	2.6, P2.52
		WKB Approximation	9.1,9.2
6	Nov 6,8	Catch-up and Midterm Nov 8 (tentative)	
7	Nov 13,15,17	Hilbert Space, Observables, Operators	3.1, 3.2, 3.3
		Statistical Interpretation, Uncertainty Principle	3.4,3.5
8	Nov 20,(22)	Dirac Notation	3.6
		Catch Up	
9	Nov 27, 29, Dec 1	TBD	
10	Dec 4,6,8	TBD	