PHYS 684: Quantum Mechanics I (Fall 2021)
Thu 4:30-7:10 pm

Course Description
This course introduces fundamental concepts of quantum mechanics at the graduate level – by developing a complete modern theoretical formalism, without emphasizing a historical perspective. Topics include: foundational concepts (state vectors, operators, representations, wavefunctions), the postulates of quantum mechanics, dynamics (Schrodinger equation, Heisenberg and Schrodinger pictures, propagators, path-integral), bound-state problems (quantum wells, harmonic oscillator, spherically-symmetric potentials), angular momentum and spin (rotations, addition of angular momenta, tensor operators), quantum measurements and statistics (density matrix), symmetries and gauge theories. [the first 4 chapters of the textbook]

Prerequisites: PHYS 305, 308, 402; MATH 313, 314 – or equivalent.

Course Textbooks
- *Modern Quantum Mechanics* (3rd or 2nd edition), J. J. Sakurai and Jim J. Napolitano

Lectures
Predrag Nikolic
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Office Hours
after class or by appointment

Grading
- Homework 20%, midterm exam 40%, final exam 40% (of the final score)
- The final letter grade is based on the final score and the overall class performance.

Homework
- Assigned on Blackboard once a week to help you develop problem-solving skills.
- Due by midnight on the following Thursday (upload scans of your work to Blackboard). Solutions will be promptly posted on Blackboard.
- Effort matters – evidence of serious attempts and work on all assigned problems earns substantial credit.
- If you want feedback, please write legibly and follow "homework and exam requirements" posted on Blackboard.

Exams
- Both midterm and final exams cover all prior lecture and homework subjects.
- Based solely on problem solving. Problems are not identical (and sometimes not even similar) to homework, so developing analytical skills and understanding course concepts is crucial. Solving homework and practicing problems, *after mastering the theory*, is the only effective preparation!
- Format: 2.5-3 hours (class time), 4-5 problems, closed book with a formula sheet (tentative).
- It is the responsibility of each student to attend classes during scheduled examinations as listed in the syllabus regardless of work or family considerations. Make-up exams will be given only to students with a valid medical excuse provided they contact the instructor a week in advance or as soon as possible.

Important dates

Aug 30:	Last day to add classes
Sep 07:	Last day to drop classes with no tuition penalty
Sep 14:	Last day to drop classes with 50% tuition penalty
Sep 27:	Unrestricted withdrawal period ends (100% tuition liability)
Dec 06-07	Reading days

Tentative class, homework and exam schedule

Aug 26	Thu	1.	
Sep 02	Thu	2.	HOMEWORK 1 OUT
Sep 09	Thu	3.	HOMEWORK 1 IN, HOMEWORK 2 OUT
Sep 16	Thu	4.	HOMEWORK 2 IN, HOMEWORK 3 OUT
Sep 23	Thu	5.	HOMEWORK 3 IN, HOMEWORK 4 OUT
Sep 30	Thu	6.	HOMEWORK 4 IN, HOMEWORK 5 OUT
Oct 07	Thu	7.	HOMEWORK 5 IN
Oct 14	Thu	8.	MIDTERM EXAM, in class
Oct 21	Thu	9.	HOMEWORK 6 OUT
Oct 28	Thu	10.	HOMEWORK 6 IN, HOMEWORK 7 OUT
Nov 04	Thu	11.	HOMEWORK 7 IN, HOMEWORK 8 OUT
Nov 11	Thu	12.	HOMEWORK 8 IN, HOMEWORK 9 OUT
Nov 18	Thu	13.	HOMEWORK 9 IN, HOMEWORK 10 OUT
Nov 25	Thu		Thanksgiving recess
Dec 02	Thu	14.	HOMEWORK 10 IN
Dec 09	Thu		FINAL EXAM, 4:30–7:15 pm