Syllabus for Quantum Mechanics

Dongxue Qu

Fall 2026

Course Information

- Course: Quantum Mechanics
- Course level: Undergraduate
- Semester: Fall 2026
- Course website: https://qudx54632.github.io/qudx.github.io/teaching/qm/
- Instructor: Dongxue Qu (曲东雪)
- Email: dqu@cdut.edu.cn
- Teaching assistant: Min Sun (孙敏)
- Teaching assistant email: 3257887316@qq.com
- Office hours: Wednesdays, 16:00–17:00
- Location: 北翼楼，5 教 8 楼 5824（芙蓉餐厅对面）

Emails will normally be answered during regular working hours.

Course Meeting Times

- Total number of lectures: 24.
- Class times: Mondays and Wednesdays, Periods 3–4 (1.5 hours per lecture).
- The first lecture will take place on September 2. The detailed lecture schedule will be updated on the course website throughout the semester.

Prerequisites

Students should be familiar with calculus, linear algebra, differential equations, and classical mechanics.

Description

This course introduces the foundations and essential techniques of quantum mechanics. Topics include quantum states and observables, wave functions and the Schrödinger equation, operators and quantum measurement, one-dimensional quantum systems, angular momentum and spin, central potentials, approximation methods, and identical particles.

Recommended Textbooks

- Griffiths, David J., and Darrell F. Schroeter. *Introduction to Quantum Mechanics*. 3rd ed., Cambridge University Press, 2018.
- 曾谨言：《量子力学教程》，科学出版社。

Additional lecture notes, assignments, and resources will be posted on the course website during the semester.

Topics

The course provides a standard undergraduate-level introduction to quantum mechanics. The main subject areas are:

- Physical motivation and fundamental principles of quantum theory
- Quantum states, observables, measurement, and the uncertainty principle
- Quantum dynamics and stationary-state problems
- Representative one-dimensional systems, including confinement, tunneling, and scattering
- The harmonic oscillator and algebraic methods
- Rotational symmetry, angular momentum, and quantum systems with central potentials
- Many-particle systems, spin, periodic structures, and nonclassical correlations

Learning Objectives

By the end of the course, students will be able to:

- understand the postulates and mathematical framework of quantum mechanics;
- solve the Schrödinger equation for standard quantum systems;
- work with operators, commutators, expectation values, and quantum measurements;
- analyze angular momentum and spin; and
- apply approximation methods to systems without exact solutions.

Grading

The course grade will be based on the following components:

- Homework: 25%
- Class participation: 10%
- Final exam: 60%
- Class performance (attendance and engagement): 5%

Final Exam

The date, time, format, and location of the final examination will be announced during the semester.

Homework

The homework policies are as follows:

- Assignments will be posted on the course website. The due date for each assignment will be provided when the assignment is released.
- All solutions must be handwritten and clearly legible.
- Late homework will receive half credit. For example, a score of 90% on a late submission will be recorded as 45%.
- The average homework score will be used to determine the homework component of the final grade.

Homework is an important part of this course. Students are encouraged to work through the problems independently. They may discuss the problems with classmates or consult external resources; however, all submitted solutions must reflect each student's own work.

Plagiarism is a serious offense. Do not copy another person's work or submit work that is not your own. If plagiarism is detected, the grade for that homework will be zero.