

Syllabus for Quantum Mechanics II

Instructor: Bruno Uchoa
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 Lectures: 3:0 to 4:15pm MW at NH103
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Texts

- *Modern Quantum mechanics*, Sakurai

References

- *Principles of Quantum Mechanics*, R. Shankar

Grading

- Homework (20%)
- Two Exams (25% each)
- Final Exam (30%)

Class schedule

There will be no classes in the following dates: March 14 and March 16, 2022.

Exam Schedule (tentative)

Exam I	Wed. Feb. 23	3:00 to 5:00 PM
Exam II	Mon. April 04	3:00 to 5:00 PM
Final Exam	Wed. May 11	4:30 to 6:30 PM

Time and dates will be confirmed.

Tentative Course Outline

In this course, I will assume you are familiar with axiomatic quantum mechanics. The tentative outline of the course involves the following topics:

1. Theory of spin and angular momentum

Addition of angular momenta; Glebsch-Gordan coefficients; Wigner-Eckart theorem; Spherical tensors.

2. Symmetries in quantum mechanics

Symmetries and conservation laws; Parity, inversion and time-reversal symmetries.

3. Identical particles

Permutation group; Bosons and fermions; Two electron-problem; Entanglement; Permutation symmetry; Pauli exclusion principle; Second quantization; field operators.

4. Approximation methods

Time dependent and time independent perturbation theory.

5. Scattering Theory

Lippmann-Schwinger equation; Born approximation; Optical theorem; Phase shift; Scattering of two identical particles, Scattering matrix.

6. Relativistic quantum mechanics

Dirac equation; Electromagnetic coupling; Symmetries of the Dirac equation.