Birzeit University

Physics Department

Phys 433 Quantum Mechanics I

Instructor: Dr. Hazem Abusara   Session: Fall 2021
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Office: Office: Baramki217
Office Hours: by appointment

Lecture Times: MW: 10:00-11:15   Room: S.Abdulhadi372,Sci112

Textbooks

- Griffiths, David J, Introduction to Quantum Mechanics, 3rd edition (required)

- Quantum Mechanics (2 vol. set) by Claude Cohen-Tannoudji, Bernard Diu and Frank Laloe

- Principles of Quantum Mechanics, 2nd Edition by Ramamurti Shankar.

- J. J. SAkurai, Modern Quantum Mechanics, Revised Edition. (advanced)

Course Description

This class has two prerequisite: Phys232 (Modern Physics) and Phys333 (Mechanics I), you must be familiar with the topics and concepts covered in the previous classes. In case you have any problems with any of them, you must address it, please refer to me for consultation.
I strongly encourage student to review the basic concepts of Linear algebra such as: Matrix algebra, vector space, eigenvalue problem.

The aim of the class is to introduce upper level undergraduate students to the basic concepts of Quantum Mechanics. The students should be able to solve problems and understand physical phenomena related to quantum mechanics, and understand the difference between classical and quantum pictures.

In the end of the class the student should be able distinguish between the classical and quantum pictures, be able solve shrödinger equation in one and three dimensions for different potentials such as square well and harmonic oscillator. The student also is expected to work with the Dirac notations. Understand the physics in the hydrogen atom and the spin of the electron, and the addition of angular momentum. Finally, if time permits should apply the knowledge obtained to system of identical particles.

Evaluation

First Exam	20%
Second Exam	20%
Homeworks	20%
Final exam	40%

Lecture Schedule

- The wavefunction

- The time-independent shrödinger equation

- Formalism

- Quantum mechanics in three dimension

- Identical particles

- Symmetry in Quantum mechanics

Assignment Details

Homework will be assigned in the end of each lecture, and are due one week later. You must turn in your homework on the due date; late homeworks will be given a zero grade, otherwise your final grade on the assignment will be reduced by a factor of $e^{-t/24}$, t is the number of elapsed hours after the due time of the assignment. Homeworks are crucial to understanding the material deeply. After attempting each problem by yourself, you are encouraged to discuss the problems with me and with each other. **However, you must write-up your solutions by yourself**. Your solutions should not be transcriptions or reproductions of someone else's work. **Any copied homeworks will get a grade of zero, and will be considered as plagiarism.**