



İTÜ FEN EDEBIYAT FAKÜLTESİ FİZİK BÖLÜMÜ 34469 MASLAK, İSTANBUL

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FIZ-314E QUANTUM MECHANICS I (CRN 20344) SPRING 2020

LECTURE HOURS

Monday 8:30-10:30 FEB 104

Wednesday 8:30-10:30 FEB D202

Friday 8:30-9:30 FEB D104

OFFICE HOURS/OFFICE

Wednesday/Friday 13:00-15:00, Office consultation can also be arranged by appointment via e mail. / Physics Dept. B4-116.

TENTATIVE OUTLINE

- 1. The Wave Function:** The Schrödinger equation, The Statistical Interpretation, Probability, Normalization, Momentum, The Uncertainty Principle.
- 2. Quantum Mechanics in 1-Dimension:** Stationary States, The Infinite Square Well, Parity, The Symmetric Infinite Well, The Harmonic Oscillator, The Free Particle, Amplitude Function and The Uncertainty Principle, Dirac Delta Function, Bound & Unbound States, The Potential Barrier, The Finite Square Well.
- 3. Formalism:** Linear Algebra (brief discussion), The Hilbert Space, Postulates of Quantum Mechanics, The Time Evolution of States and Expectation Values, The Energy-Time Uncertainty Principle, The Energy Representation & Harmonic Oscillator.
- 4. Quantum Mechanics in 3-Dimensions:** Generalization to 3-dimensions, The Free Particle (Cartesian Coordinates), Separable Hamiltonians, 3-Dimension Infinite Well, The Isotropic Harmonic Oscillator, 2-Dimensional Systems.
- 5. Angular Momentum:** The angular momentum operators, The angular momentum algebra (general formalism of angular momentum), Eigenstates of the angular momentum operators, The angular momentum matrices, The rigid rotator.

REFERENCES

1. Introduction to Quantum Mechanics, D. J. Griffiths, Pearson Prentice Hall, 2nd Ed. 2005.
2. Principles of Quantum Mechanics, H. C. Ohanian, Prentice Hall, 1990.
3. Introductory Quantum Mechanics, R. Liboff, Addison-Wesley, 3rd Ed. 1998.
4. Quantum Physics, S. Gasiorowicz, John Wiley & Sons, 3rd Ed. 2003.
5. Quantum Mechanics: classical results, modern systems, and ..., R.W. Robinett, Oxford Univ. Press, 1997.

GRADING

Quizzes 25%, Problem Sets (PS) 5%, Midterm Exam 30%, Final Exam 40%

VF CONDITION

In order to take the final exam "in-term success grade" that is "the grading up to the final (GbF)" must be 20/100

QUIZZES

In-class quizzes will be given. The problems on the quizzes will be closely related to those discussed in class.

Every FRIDAY 8:30-9:30

PROBLEM SETS (PS)

Given every 15 days (on **Fridays**) and received next **Friday** at 8:30

Later on, the answers will be posted

LATE PROBLEM SETS NOT ACCEPTED

MIDTERM: April 15, 2020 Wednesday, 8:30-10:30

FINAL EXAM: Between **May 28- June 7, 2020**