İTÜ Fen Edebİyat Fakültesİ Fİzİk Mühendİslİğİ Bölümü

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FIZ-314E QUANTUM MECHANICS I (CRN 20983) SPRING 2021

LECTURE HOURS
Monday 8:30-10:30 online
Wednesday 8:30-10:30 online
Friday 8:30-9:30 online

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, Dirac Delta Function, The Free Particle, 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-Dimensional Infinite Well, The Isotropic Harmonic Oscillator, Cental Potentials in 2-Dimension.
5. **Angular Momentum:** The angular momentum operators, The angular momentum algebra (general formalism of angular momentum), Eigenstates of the orbital angular momentum, 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 Unv. Press, 1997.

GRADING

Quizzes 25% (in between 4-10)

Problem Sets (PS) 5% (max. 4)

Midterm Exam 30% (just 1)
Final Exam 40%

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 EXAM: April 28, 2021 Wednesday, 8:30-10:30

FINAL EXAM: Between **June 14-27, 2021**