PH 101 Physics - I (2-1-0-6)

Classical Mechanics: Review of Newtonian Mechanics in rectilinear coordinate system. Motion in plane polar coordinates. Conservation principles .Collision problem in laboratory and centre of mass frame.Rotation about fixed axis. Non-inertial frames and pseudo forces .Rigid body dynamics. Special Theory of Relativity: Postulates of STR. Galilean transformation. Lorentz ransformation.Simultaneity.Length Contraction.Time dilation.Relativistic addition of velocities.Energy-momentum relationships. Quantum Mechanics: Two-slit experiment. De Broglie's hypothesis.Uncertainty Principle, wave function and wave packets, phase and group velocities.Schrödinger Equation.Probabilities and Normalization.Expectation values.Eigenvalues and eigenfunctions. Applications in one dimension: Particle in a box, Finite Potential well, Harmonic oscillator.

Textbooks:

[1] D. Kleppner and R. J. Kolenkow, An Introduction to Mechanics, Tata McGraw-Hill, 2000.

[2] R. Eisberg and R. Resnick, Quantum Physics of Atoms,Molecules,Solids,Nuclei and Particles, 2nd Ed., John-Wiley, 1985

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References:

[1] R. P. Feynman, R. B. Leighton, and M. Sands, The Feynman Lectures on Physics, Vol.I, Norosa Publishing House, 1998.

[2] J.M. Knudsen and P.G. Hjorth, Elements of Newtonian Mechanics, Springer, 1995.

[3] R. Resnick, Introduction to Special Relativity, John Wiley, Singapore, 2000.

[4] A. Beiser, Concepts of Modern Physics, Tata McGraw-Hill, New