

Syllabus for Foundation course in Physics- (For PhD candidates registering under Department of Physics)

Physical quantities, measurements and vectors, Kinematics: Description of Motion, The Laws of Motion, Work and Energy, Linear momentum and collisions, Rigid bodies and Angular momentum, Universal Gravitation, Simple harmonic motion, Waves, Fluid mechanics,

Temperature, The First Law of Thermodynamics, Kinetic Theory of Gases and Maxwell - Boltzmann Statistics, Heat Engines, Entropy and the Second Law of Thermodynamics,

Charges, Electric Fields and Gauss's law, Electric Potential, Electrostatics Laws in differential form, Capacitance and Dielectrics, Sources of Magnetic Fields, Electromagnetic Induction, Inductance and AC circuits, Electromagnetic Waves

Light and the Laws of Geometric Optics, Image Formation, Interference of Light Waves, Diffraction and Polarization

Black body radiation, Photo electric and Compton effect, Elements of Quantum Mechanics, One dimensional potential well, One dimensional Quantum mechanical Tunneling.

The Ideal Maxwell-Boltzmann Gas, The Ideal Fermi Gas, The Ideal Bose Gas, Elements of statistical Mechanics, Fermi energy, Crystal Structure, Band Theory of electrons in crystalline solids, Magnetic Properties of materials.

Reference Books:

1. Serway and Jewitt, Physics for Scientists and Engineers (7th Edition)
2. Young and Friedman, University Physics (12th Edition)
3. Halliday, Resnick and Walker, Fundamentals of Physics, Extended (8th Edition)
4. Harris Benson , University Physics, Revised Edition
5. D J Griffiths, Introduction to Electrodynamics
6. Robert Eisenberg and Robert Resnick , Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles
7. Arthur Beiser: Concepts of Modern Physics
8. Ralph Baierlein; Thermal Physics
9. D J Griffiths, Introduction to Quantum Mechanics
10. Eugene Hecht : Optics

Note: The syllabus is only indicative. This is for self study and objective is to have a very good foundation in Physics which enables the candidate to undertake a research career.