भौतिकी विभाग
PHYSICS
DEPARTMENT

राष्ट्रीय प्रौद्योगिकी संस्थानश्रीनगर
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR
(शिक्षामंत्रालय,
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(An autonomous Institute of National Importance under the aegis of Ministry of Education, Govt. of India)
हज़रतबल, श्रीनगर, जम्मू-कश्मीर, 190006, भारत
Hazratbal, Srinagar Jammu and Kashmir, 190006, India

Syllabus for M.Sc. Physics Entrance Examination

UNIT–I: Mathematical Physics

Vector algebra and vector calculus; Differential and integral calculus; Partial differentiation; Ordinary differential equations; Matrices and determinants; Eigenvalues and eigenvectors; Complex numbers and complex variables; Fourier series; Elementary probability theory; Error analysis.

UNIT–II: Classical Mechanics

Newton's laws of motion; Conservation of energy, linear momentum and angular momentum; Motion under central forces; Oscillatory motion; Simple harmonic motion; Damped and forced oscillations; Rigid body dynamics; Rotational motion; Gravitation; Elements of special relativity.

UNIT–III: Electricity, Magnetism and Electromagnetic Theory

Electrostatics; Gauss's law and its applications; Electric potential and capacitance; Dielectrics; Magnetostatics; Biot–Savart law and Ampere's law; Electromagnetic induction; Maxwell's equations; Electromagnetic waves; Electrical circuits and network theorems.

UNIT–IV: Optics

Wave optics; Interference of light; Diffraction; Polarization; Coherence; Lasers and their applications; Optical fibres; Holography (basic concepts).

UNIT–V: Quantum Mechanics and Atomic Physics

Black-body radiation; Photoelectric effect; Compton effect; Wave-particle duality; Uncertainty principle; Schrödinger equation; Particle in a box; Quantum tunnelling; Hydrogen atom; Atomic spectra; Angular momentum and spin.

UNIT–VI: Thermodynamics and Statistical Physics

Laws of thermodynamics; Thermodynamic processes; Entropy and thermodynamic potentials; Kinetic theory of gases; Maxwell–Boltzmann distribution; Statistical concepts; Bose–Einstein and Fermi–Dirac statistics; Black-body radiation.

UNIT–VII: Electronics

Semiconductor physics; p–n junction diode; Rectifiers and filters; Transistors and amplifiers; Operational amplifiers; Oscillators; Logic gates; Digital electronics; Number systems and Boolean algebra.

UNIT–VIII: Solid State Physics

Crystal structure; Crystal bonding; Reciprocal lattice; X-ray diffraction; Free electron theory; Band theory of solids; Semiconductors; Superconductivity; Magnetic properties of materials.