

Department of Physics

Courses of Preparatory Programme

Code	Name	L	T	P	C
PH001	Preparatory Physics I	3	2	0	10
PH002	Preparatory Physics II	3	2	0	10

Detailed Syllabi

Preparatory Courses:

PH001: Preparatory Physics-I

3 2 0 10

Units, Dimensions, Errors of measurements, Accuracy of data, Physical quantities as vectors, scalar and vector multiplication, gradient, divergence and curl. Coordinate axes, Cartesian, cylindrical, plane polar and spherical polar axes systems. Kinematics of particles in 1-d, 2-d and 3-d, Newton's laws of motion. Conversion laws for energy and momentum, Rotational motion, kinematics and dynamics, Simple oscillatory motion: harmonic systems. Waves, characteristics, propagating and stationary waves, Doppler effect, interference of waves, diffraction.

Texts:

1. D. Halliday, R. Resnick and J. Walker, *Fundamentals of Physics*, John Wiley, Singapore (2001).

PH002: Preparatory Physics-II

3 2 0 10

Coulomb's law, Gauss' law, field and potential. Magnetic field, force and torque on current carrying conductors, forces between current carrying conductors. Faraday's laws of induction, capacitors, inductors and resistors, electrical circuits, energy stored, dissipated and time constants, time-varying fields and applications. Structure of the atom: Bohr's model, Spectra of hydrogen and hydrogen-like atoms, X-rays, production, spectra. Black body radiation, spectrum, Wien's law, Stefan's law, Planck's theory, Matter waves, uncertainty principle, quantization, x-ray diffraction, electron diffraction, neutron diffraction. The atomic nucleus, binding energy, radioactivity, nuclear reactions, fission, fusion.

Texts:

1. D. Halliday, R. Resnick and J. Walker, *Fundamentals of Physics*, John Wiley, Singapore (2001).