

Syllabus

PANJAB UNIVERSITY, CHANDIGARH

B.Sc. Sem. V

Paper A : CONDENSED MATTER PHYSICS - I

(30 Hrs.)

UNIT-I

Crystal structure : Symmetry operations for a two dimensional crystal. Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure. Crystal diffraction : Bragg's Law, Determination of crystal structure, Laue equations, Reciprocal lattices of SC, BCC and FCC, Bragg's law in reciprocal lattice, Brillouin zones and its derivation in two dimensions, structure factor and atomic form factor.

UNIT-II

Band Theory of solids, periodic potential and Bloch theorem, Kronig-Penney model, band gaps, band structures in conductors, direct and indirect semiconductors and insulators. Free electron theory of metals, effective mass, drift current, mobility and conductivity (carrier concentration and mobility of carriers) and their variation with temperature in semiconductors, Fermi level positions in intrinsic and extrinsic semiconductors, Wiedemann Franz law, Hall effect in metals and semiconductors.