SUBJECT NO-PH60406, SUBJECT NAME- GROUP THEORY AND ITS APPLICATION

LTP- 3-0-0,CRD- 3

SYLLABUS :-

Pre-requisite: PH30006 Mathematical Methods IIBrief review of the representations of finite groups; Unitary and Irreducible representations; Introduction to Lie groups; Examples from the rotation group and SU(2); The representation theory of compact Lie groups; Lie algebra; Simple and semi-simple Lie algebras; Invariant operators and labeling of irreducible representations; Spinor and Vector representations of Lorentz group; The Clebsch-Gordan problem; Wigner-Eckart theorem. Cartan classification of compact simple Lie Algebras-Generators; Cartan subalgebra Roots; Cartan matrix; A_r, B_r, C_r, D_r and Exceptional root systems and Dynkin diagrams; Representations of compact simple Lie algebras; Weights and Multiplicities; Weyl group, Finite Coxeter groups, Crystallograpic groups. Baryons and mesons; Quark model, SU(3) symmetry; The Gell-Mann matrices of SU(3); Fundamental and adjoint representations; Young tableaux; Meson and baryon octets and baryon decuplet.