SUBJECT NO-PH41016, SUBJECT NAME- Nuclear and Particle Physics -I

LTP- 3-0-0,CRD- 3

SYLLABUS :-

Nuclear properties: General properties: radius, mass, binding energy , nucleon separation energy, angular momentum, parity , electromagnetic moments, excited states . Nuclear models: liquid drop model, semi - empirical mass formula, mass parabolas, beta stability line, collective rotations and vibrations. magic numbers, independent particle shell model, ground state spins. Nuclear reactions: energetics, conservation laws, classification of nuclear reactions, fusion and fission. Radioactive decay: radioactive decay law, production and decay of radioactivity, radioactive dating.

Alpha decay: Gamow theory and branching ratios. Beta decay: energetics, angular momentum and parity selection rules, Elementary ideas of Fermi theory. Fermi and Gamow - Teller transition probabilities, Kurie plot and mass of a neutrino. Gamma decay: energetics, Mossbauer effect, angular momentum and parity selection rules, Detectors and Accelerators: detection of nuclear radiations, interaction of radiation with matter, gas - filled ionization detectors, semiconductor detectors, solid state scintillation counters. Modern Accelerators, synchrotrons, linear accelerators.