1.	Title of the course	Nuclear and Particle Physics
2.	Course number	PH604L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To PH6202/10
6.	To be offered by	Department of Physics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce the basic aspects of nuclear and particle physics by discussing the structure of nuclei, interaction of nucleons, radioactive decays, elementary particles and their interactions.	
10.	**Course Content:** Nuclear properties: radius, mass, binding energy, angular momentum and parity, magnetic moments; Nuclear forces: two-nucleon system (Deuteron), nucleon-nucleon scattering, Meson exchange model; Nuclear models: liquid drop, Fermi gas, shell and collective models; Radioactive decays: alpha, beta and gamma decays; Nuclear reactions: conservation laws, reaction cross sections, Coulomb scattering, nuclear scattering, nuclear fission, fusion; Elementary particles: Fermions, Bosons, eightfold way, Quark model, standard model; Overview of particle interactions: relativistic kinematics, Dirac equation, electromagnetic interactions, weak and strong interactions, discrete symmetries, CP violation, time reversal and TCP theorem; Experimental methods: linear accelerators, cyclotrons, synchrotrons, storage ring collider, particle detectors.	
11.	**Textbook(s):** 1. Griffiths D, *Introduction to Elementary Particles*, Wiley VCH (2008). 2. Krane K S, *Introductory Nuclear Physics*, Wiley (2008).	
12.	**Reference(s):** 1. Bertulani C A, *Nuclear Physics in a Nutshell*, Princeton University Press (2007). 2. Martin B R and Shaw G, *Particle Physics*, Wiley-Blackwell (2008). 3. Perkins D H, *Introduction of High Energy Physics*, Cambridge University Press (2000). 4. Wong S S M, *Introductory Nuclear Physics*, Wiley VCH (1998).	