1.	Title of the course	Introduction to Condensed Matter Theory
2.	Course number	PH608L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To PH6121/10
6.	To be offered by	Department of Physics
7.	To take effect from	January 2022
8.	Prerequisite	CoT
9.	**Course Objective(s):** To introduce the theoretical foundations of condensed matter physics. To familiarize with different theoretical models and to discuss the relevant techniques for the understanding of the properties of the common and synthesized matters.	
10.	**Course Content:** Characteristic scales, order and disorder, collective modes and elementary excitations; Non-interacting electrons: Drude and Sommerfeld models, heat and electrical conductivity, band theory and semiconductor physics; Interacting electrons: Fermi-liquid theory, Hubbard and Heisenberg models, perturbation and mean-field theories; Green's functions and equation of motion methods; Linear response theory and Kubo formula; Transport in mesoscopic systems; Phase transitions and broken symmetry; Special topics: magnetism, Kondo problem, superfluidity and superconductivity, topological phases of matter.	
11.	**Textbook(s):** 1. Bruus H and Flensberg K, *Many-Body Quantum Theory in Condensed Matter Physics: An Introduction*, Oxford University Press (2004). 2. Coleman P, *Introduction to Many-Body Physics*, Cambridge University Press (2015).	
12.	**Reference(s):** 1. Ashcroft N W and Mermin N, *Solid State Physics*, Harcourt College Publishers (1976). 2. Kittel C, *Introduction to Solid State Physics*, Wiley (2012). 3. Kittel C, *Quantum Theory of Solids*, Wiley (1987). 4. Sander L M, *Advanced Condensed Matter Physics*, Cambridge University Press (2009).	