

1.	Title of the Course	Quantum Mechanics I
2.	Course Number	PH5107
3.	Status of the Course	Core
4.	Structure of Credits	3-1-0-4
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Physics
8.	To take effect from	July 2020
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To introduce foundational aspects and the basic mathematical framework of quantum mechanics and to discuss the characteristics of simple quantum systems.	
12.	Course Content: Uncertainty principle, wave particle duality; Mathematical framework: State vectors and operators in Hilbert space, expectation values; Schrodinger equation, wavefunction and its interpretation; Time evolution in the Schrodinger, Heisenberg and Dirac pictures; Simple quantum systems: 1D potential wells/barriers, tunnelling, linear harmonic oscillator; Central force and angular momentum operator, addition of angular momenta; Symmetries and invariance; Hydrogen atom and SO(3) symmetry; Spin 1/2 systems and SU(2) symmetry; Feynman Path Integrals; Other foundational aspects: measurement, entanglement, EPR paradox and Bell's inequalities, locality problem.	
13.	Text book(s): 1. Sakurai J J, <i>Modern Quantum Mechanics</i> , Pearson Education India (2013). 2. Shankar R, <i>Principles of Quantum Mechanics</i> , Springer India (2010).	
14.	Reference(s): 1. Cohen-Tannoudji C, Diu B and Laloe F, <i>Quantum Mechanics</i> , Wiley-VCH (1992). 2. Dirac P A M, <i>The Principles of Quantum Mechanics</i> , Clarendon Press (1981). 3. Landau L D and Lifshitz E M, <i>Quantum Mechanics: Non-Relativistic Theory</i> , Elsevier India (2004). 4. Zettili N, <i>Quantum Mechanics: Concepts and Applications</i> , Wiley (2009).	