1.	Title of the course	Classical Electrodynamics
2.	Course number	PH502L
3.	Structure of credits	3-1-0-4
4.	Offered to	PG
5.	New course/modification to	Modification To PH5105/10
6.	To be offered by	Department of Physics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To equip students with advanced knowledge in understanding the principles and dynamics of electromagnetic phenomena that occur in static and time-varying sources. To acquire necessary mathematical knowledge for detailed description of these phenomena required for solving related problems. To acquire a sense of unity in Physics at a fundamental level by embracing the concepts of special theory of relativity as emergent through the laws of electrodynamics.	
10.	**Course Content:** Helmholtz and uniqueness theorem; Poisson and Laplace equations, Dirichlet and Neumann boundary conditions; Boundary value problems and Green's function formalism; Method of images; Multipole expansion, electromagnetic fields in matter; Maxwell's equations, gauge transformations, energy, momentum and angular momentum of fields, Poynting's theorem; Electromagnetic waves: wave propagation in dielectrics and conductors, dispersion, absorption, Kramers-Kronig relations; Waveguides; Special theory of relativity: 4-formalism, Lorentz transformation, space-time diagrams; Field produced by a uniformly moving charged particle and accelerating charged particle, Lienard-Wiechert potentials, dipole radiation, Larmor formula, synchrotron radiation, radiation losses, radiation reaction, Abraham-Dirac-Lorentz equation; Scattering: Rayleigh and Mie, critical opalascence.	
11.	**Textbook(s):** 1. Griffiths D J, *Introduction to Electrodynamics*, Pearson Education India Learning Private Limited (2015). 2. Jackson J D, *Classical Electrodynamics*, Wiley (2007).	
12.	**Reference(s):** 1. Deshmukh P C, *Foundations of Classical Mechanics*, Cambridge University Press (2019). 2. Landau L D and Lifschitz E M, *The classical theory of fields (Vol. 2: Course of Theoretical Physics)*, Butterworth-Heinemann (1987). 3. Panofsky W K H and Phillips M, *Classical Electricity and Magnetism*, Sarat Book House (2006). 4. Zangwill A, *Modern Electrodynamics*, Cambridge University Press (2012).	