

PHY5103 Classical Electrodynamics

Course Code	PHY5103	Semester	I
Course Title	<i>Classical Electrodynamics</i>		
Credits	4	Type	Core

Course Outcome

- (1) To train students in applying the laws of classical electrodynamics to modern experimental systems.
- (2) To teach students how the laws of electrodynamics is used in modern communication systems
- (3) To develop skills in numerically solving problems of practical interest.

Course Structure

Contents: Electrostatics: Calculation of fields and potentials. Conductors. Boundary value problems. Multipole expansion and method of images. Electrostatics with dielectrics. Electrostatic energy. Magneto-statics: Ampere's theorem and Biot Savart law. Induction and Maxwell's equation. Electromagnetic waves and Poynting theorem. Waves in dielectrics and conducting media. Scalar and vector potential. Waves at boundary, reflection and refraction. Polarization. Rectangular waveguides and dielectric slab waveguides. Radiation from accelerating charges. Dipole antenna. Special theory of relativity and Lorentz transformation of fields.

Suggested Books

- D. J. Griffiths, Introduction to Electrodynamics, Pearson (2012)
- J.D. Jackson, Classical Electrodynamics, Wiley (2007)
- A. Zangwill, Modern Electrodynamics, Cambridge (2013)