

MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR
DEPARTMENT OF PHYSICS

DETAILS OF THE COURSE

Course Type	Course Code	Course Title	Credits	Lecture	Tutorial	Practical	Studio
IC	26PHT102	Modern Physics	3	2	1	0	0

PREREQUISITE: None

COURSE OBJECTIVE(s)

This course aims to familiarize and equip the students with fundamental knowledge of quantum mechanics and electrodynamics. The learned knowledge would enable the students to tackle standard engineering problems.

COURSE ASSESSMENT

The Course Assessment (culminating to the final grade), will be made up of the following three components;

S. No.	Component	Weightage
a)	Internal assessment (based upon assignments, quizzes and attendance)	20%
b)	Mid-term examination	30%
c)	End Semester Examination	50%

COURSE CONTENTS

Electrodynamics - Introduction to vector analysis, Gradient, Divergence and Curl, Gauss divergence theorem and applications, Stokes theorem and applications, Laws of electromagnetism, Boundary conditions of electric and magnetic field, Maxwell's equations (differential and integral forms) and their physical significance, Displacement current and continuity equation, Vector potential, Electromagnetic wave equation and its solution in free space, Transverse nature of electromagnetic waves, Energy and momentum in electromagnetic waves, Poynting theorem and power flow **(No. of lectures- 13)**

Quantum Mechanics – Basics of quantum mechanics, Wave-particle duality, Concept of phase and group velocity, Heisenberg's uncertainty principle and its applications, Wave function and its properties, Orthogonality of wave function and expectation values, Energy and momentum operators, Schrodinger equation (time dependent and time independent), Probability current density, Solution of Schrodinger equation for 1D and 3D infinite potential well, Concepts of quantum mechanical tunneling **(No. of lectures- 13)**

TEXT BOOKS: -

1. *Introduction to Electrodynamics*, David J. Griffiths, Prentice Hall
2. *Concepts of Modern Physics*, Arthur Beiser, McGraw Hill Education

REFERENCE BOOKS: -

1. *Quantum Mechanics*, Nouredine Zettili, Wiley
2. *Engineering Physics*, Hitendra K. Malik and A. K. Singh, McGraw Hill Education