

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	22PHT101	Classical Physics	3	2	1	0	0

PREREQUISITE: None

COURSE OBJECTIVE(s)

To equip students with basic concepts and techniques related to Newtonian Mechanics of point particles and extended objects. 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

Kinematics and dynamics: polar coordinates, velocity and acceleration in polar coordinates, Review of Newton's Laws, inertial frames, frames of reference, pseudo forces, work energy theorem, conservative and non-conservative forces, work done by non-conservative forces, variable mass system: motion of rocket. Engineering Applications in Aerospace, Robotics, Mechanical, and Automotive **(No. of lectures- 8)**

Oscillations: Review of SHM. damped harmonic oscillator, overdamping, underdamping, critical damping, energy, Q-value, forced oscillations without damping, forced damped harmonic oscillations, transient and steady state behavior, resonance, resonance curve and quality factor **(No. of lectures- 5)**

Rotational motion and Elasticity: rotations about fixed axis, angular momentum along the axis and moment of inertia, angular momentum vector and inertia tensor, rotations about translating axis, rotations about translating axis, gyroscope **(No. of lectures- 8)**

Fluid Mechanics: definition of fluid, density and pressure of a fluid and hydrostatic equilibrium, pressure force on a moving fluid, Eulerian and Lagrangian description, flow patterns, volume and mass rate of flow, Equation of continuity, Euler equation, Bernoulli's equation using Euler equation, Euler equation and pressure accelerating fluid, Navier-Stokes' Equation (without derivation), viscosity, Aerofoil design considerations **(No. of lectures- 5)**

TEXT BOOKS

1. *An Introduction to Mechanics* by Kleppner and Kolenkow, McGraw Hill Education
2. *Mechanics* by D. S. Mathur, S. Chand

REFERENCE BOOKS

1. *Engineering Mechanics: Statics and Dynamics* by J. L. Meriam and L. G. Kraige, Wiley
2. *Engineering Physics* by D. R. Joshi, McGraw Hill Education