NPTEL Video Course - Physics - NOC:Mechanics, Heat Oscillations and Waves

Subject Co-ordinator - Prof. V. Balakrishnan

Co-ordinating Institute - IIT - Madras

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - The Nature of Physical Laws
Lecture 2 - Fundamental Constants and Dimensional Analysis
Lecture 3 - Dimensional analysis and scaling
Lecture 4 - sketching Elementary Functions
Lecture 5 - The fundamental forces of nature
Lecture 6 - Scalars, Victors and All That
Lecture 7 - Plane Polar Coordinates
Lecture 8 - Vectors In a Plane, Scalars and Pseudoscalars
Lecture 9 - Kinematics In a Plane
Lecture 10 - Vectors in 3-Dimensional Space
Lecture 11 - Vectors in 3-Dimensional space (Continued...)
Lecture 12 - The Finite Rotation Formula, Polar Coordinates in 3-dimensions
Lecture 13 - Cylindrical and Spherical polar coordinates
Lecture 14 - Motion in a circle - Acceleration
Lecture 15 - Newtons laws of motion
Lecture 16 - Conservation Laws and Newtons Equations
Lecture 17 - Conservation of Angular Momentum
Lecture 18 - Two-Body Scattering
Lecture 19 - Two-Body Collision Kinematics
Lecture 20 - Conservative Forces - The Concept of a Potential
Lecture 21 - Central Potential and Central Force
Lecture 22 - The 2-Body Central Force Problem
Lecture 23 - Keplers Laws of Planetary Motion
Lecture 24 - Non-Inertial Forces (Pseudo-forces)
Lecture 25 - More on the Kepler problem; Satellite motion
Lecture 26 - Linear Elasticity of Solids
Lecture 27 - Simple Harmonic Motion
Lecture 28 - Some Physical Examples of Simple Harmonic Motion
Lecture 29 - More on Simple Harmonic Motion

Lecture 30 - Damped Simple Harmonic Motion
Lecture 31 - Wave Motion - Travelling and Standing Waves
Lecture 32 - Wave Motion - Wave Equation, General Solution
Lecture 33 - Fluid Dynamics - Hydrostatic Equilibrium
Lecture 34 - Fluid Dynamics - Equation of Continuity
Lecture 35 - Fluid Flow - Bernoullis Principle
Lecture 36 - Circulation and Vorticity
Lecture 37 - What is Thermodynamics?
Lecture 38 - The Classical Ideal Gas
Lecture 39 - The Laws of Thermodynamics
Lecture 40 - Specific Heat of an Ideal Gas
Lecture 41 - Van der Waals Equation
Lecture 42 - Phase Transitions
Lecture 43 - Summary