SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR

I B. TECH, I – Semester

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Branch: CIVIL

PHYSICS (18HS0848)

Objectives:

- Basic concepts of related to vectors & Scalars and Newton's laws of motion.
- Key points related to forces.
- Basic concepts related to Mechanical Vibrations.
- Key points related to Mechanics of Solids.
- To understand the fundamentals Nano materials.

Unit – I: MOTION OF PARTICLES

Scalars and Vectors - Forces in Nature-Newton's laws -and its completeness in describing particle motion – Motion of a variable mass system, motion of a rocket.

Unit – II: FRAMES OF REFERENCES

Inertial & Noninertial frames of reference; Rotating coordinate system – Inertial forces and Properties - Centripetal and Coriolis forces– Effect of Coriolis force due to the rotation of the Earth - Applications of Centrifugal and Coriolis forces - Weather systems.

UNIT – III: HARMONIC OSCILLATORS.

Simple Harmonic oscillator and solution of differential equation, Damped harmonic motion and solution of differential equation – over damped, critically damped and lightly damped oscillators- Forced oscillations and resonance (qualitative treatment).

Unit – IV: MECHANICS OF SOLIDS.

Elasticity and isotropic materials, stress, strain and Hooke's Law- Elastic constants of Isotropic solids. Internal energy due to strain – longitudinal strain, volume strain and shearing strain - Beams- classification-types of support.

UNIT-V: PHYSICS OF NANOMATERIALS.

Introduction, significance of nano scale – surface area and quantum confinement-Quantum dot, Quantum well ,Quantum wire -Synthesis of nanomaterials- Top Down Process-Ball Milling ; Bottom Up Process: Sol-Gel method– CNT-Properties of Graphene-Applications.

Reference books:

1. Engineering Mechanics, 2nd ed. — MK Harbola.
2. Introduction to Mechanics — MK Verma.
3. Engineering Mechanics - Dynamics, 7th ed. - JL Meriam.
4. An Introduction to the Mechanics of Solids, 2nd ed. with SI Units — SH Crandall, NC Dahl & TJ Lardner.
5. Engineering Mechanics of Solids — EP Popov.
6. B.E.A. Saleh and M.C, Tech, Fundamentals of photonics, John Wiley & Sons.
7. Mechanics and Properties of Matter – J.C.Upadhyaya, Himalaya Publishing House.
8. Waves & Oscillations – D.V.Bhrahmaji and A.Srinivasa Rao, Vivek Publications
9. Engineering Physics – K.Thyagarajan, MCGrawHill Education Private Ltd, New Delhi.

Course outcomes:

Studies will be familiar with

- Various basic terms related to Vectors & Scalars and Newton's laws of motion.
- Some of the basic concepts related to forces.
- Simple terms related to Mechanical Vibrations.
- Recognize importance of various mechanical properties of materials.
- Understand the importance of Nanotechnology.