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|  | PVKN Govt. College (Autonomous) Chittoor | Program I B.Sc. Physics Hons. | | | |
| Course Code 23-PHY-2C3 | TITLE OF THE LABORATORY COURSE MECHANICS AND PROPERTIES OF MATTER | Semester-II | | | |
| Teaching | Hours Allocated: 60 Hrs (3 Hrs./wk.) | L | T | P | C |
| Pre-requisites | Basic knowledge about periodic motion and oscillations | - | 3 | - | 2 |

Syllabus:

UNIT-I : VECTOR ANALYSIS

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector fields and its physical interpretation (**No derivation**). Vector integration (line, surface and volume), Statement and proof of Gauss and Stokes theorems.

UNIT-II: MECHANICS OF PARTICLES

Laws of motion, motion of variable mass system, Equation of motion of a rocket. **Multistage rocket**, Conservation of energy and momentum, Collisions in two and three dimensions, Concept of impact parameter, scattering cross-section, Equation for angle of scattering cross-section.

UNIT-III: MECHANICS OF RIGID BODIES AND CONTINUOUS MEDIA

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body,

Precession of a top, Gyroscope, Precession of the equinoxes. Elastic constants of isotropic solids and their relations, Poisson's ratio and expression for Poisson's ratio. Classification of beams, types of bending, **types of Loads**.

UNIT-IV: CENTRAL FORCES

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, conservative force as a negative gradient of potential energy, equations of motion under a. Derivation of Kepler's laws. **GPS and its applications**

UNIT-V SPECIAL THEORY OF RELATIVITY

Theory of Relativity, Galilean relativity, Absolute frames. Michelson-Morley experiment, The negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation.

REFERENCE BOOKS:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, Sulthan Chand & Co, New Delhi
3. Mechanics - J.C. Upadhyaya, Ramprasad & Co., Agra
4. Properties of Matter - D.S. Mathur, S.Chand & Co, New Delhi ,11th Edn., 2000
5. Physics Vol. I - Resnick-Halliday-Krane ,Wiley, 2001
6. Properties of Matter – Brijlal & Subrmanyam, S. Chand &Co. 1982
7. Dynamics of Particles and Rigid bodies– Anil Rao, Cambridge Univ Press, 2006
8. Mechanics-EM Purcell, Mc Graw Hill
9. University Physics-FW Sears, MW Zemansky & HD Young, Narosa Publications, Delhi
10. College Physics-I. T. Bhima sankaram and G. Prasad. Himalaya Publishing House.
11. Mechanics, S. G. Venkata chalapathy, Margham Publication, 2003.