Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

DEGREE PROGRAM

B. Sc. I Sem

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL					
			End Sem University Exam	Two Term Exam	Teachers Assessment *	End Sem University Exam	Teachers Assessment*	Th	T	P	CREDITS
BSPH 102	DC	General Properties of Matter and Mechanics	60	20	20	30	20	3	1	4	6

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
Q/A – Quiz/Assignment/Attendance, MST Mid Sem Test.
*Teacher Assessment shall be based on following components: Quiz/Assignment/ Project/Participation in class (Given that no component shall be exceed 10 Marks)

Course Objectives:-

1. To develop the comprehensive understanding of laws of physics related to General Properties of Matter and Mechanics and ability to apply them for laying the foundation for research and development.
2. To work ethically as member as well as leader in a diverse team.

Course Outcomes:-

1. Student will be able to understand and solve the problems related to General Properties of Matter and Mechanics and Student will be able to understand and solve the problems related to General Properties and Mechanics
2. Student will be able to determine physical parameter experimentally with optimal usage of resources and complete the assignments in time.

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Paper-I: General Properties and Mechanics

Unit – I: Conservation Laws

System of particles: Centre of mass for a system of particles, motion of the centre of mass. Expressions for kinetic energy, linear momentum and angular momentum for a system of particles in terms of centre of mass values. Central forces and the law of conservation of angular momentum

Unit-II: Elasticity

Elasticity, Effect of temperature and impurities on elasticity of a substance; deformation, Stress and Strain; Hook's law, Young's modulus, Poission's ratio, Relationship between the various elastic moduli. Bending of beam and bending moment, Cantilever, transverse oscilations of a cantilever. Elastic and Inelastic Collisions between particles

Unit- III: Oscillations

SHM: Simple Harmonic Oscillations, Differential equation of SHM and its solution. Kinetic energy, potential energy, total energy and their time-average values. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor.

Unit-IV: Rotational Dynamics

Angular momentum, Torque, Rotation about a fixed axis. Moment of Inertia. Calculation of moment of inertia for rectangular, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translation and rotation. Kepler's laws, deduction of Newton's law of gravitation from Kepler's laws.

Unit-V: Fluid Mechanics

Ideal and Viscous fluid, Stream-line nd Turbulent flow. Reynold's number, Rotational and irrotatinal flow, Equation of continuity, Bernoulli's theorem, viscous flow of fluids, Effect of pressure and temperature on the coefficient of viscosity. Intermolecular forces- cohesive and adhesive forces. Surface tension, Surface energy, Effect of temperature and impurities on the surface tension. Angle of contact; expression for pressure on a curved surface.

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References

1. Mathur, D.S. : Mechanics (S. Chand)
2. Mechanics, Berkeley Physics, vol.1, C.Kittel, W.Knight. et.al. 2007, Tata McGraw-Hill.
3. Berkley Physics Course vol. I (Mechanics)
4. Halliday and Resnic; Physics, vol. I
5. Keppler and Kolenkow; Classical Mechanics
6. Halliday and Resnick; Physics, vol. I
7. Klepper and Kolenkow; Classical Mechanics

List of experiments: (Any Eight)

1. To verify laws of perpendicular axes for moment of inertia.
2. To determine acceleration due to gravity using compound pendulum.
3. To determine Young's Modulus by bending of beam method.
4. To determine Young's Modulus using Cantilever method.
5. To determine Surface Tension by Jaeger's method.
6. To determine Viscosity of fluid using Poisellie's method.
7. To determine Modulus of rigidity by Torsion pendulum.
8. To determine Young's Modulus of long wire by Searl's method.
9. To determine Poisson's ratio of rubber tube.
10. To determine the force constant of the given spring and to verify that the force constant of a parallel combination of spring.