Veer Narmad South Gujarat University, Surat

Syllabus as per NEP-2020

B.Sc. Semester: I & 2 (PHYSICS)

- **Physics Major (Discipline Specific Core-DSC)**
- **Physics Minor (Generic Elective-GE)**
- **Multidisciplinary Courses (MDC)**
- **Skill Enhancement courses (SEC)**

(Effective from theAcademicYear2023-24)

B.Sc. Semester I (Physics Major)

B.Sc. Semester-I
Course code: PH-MJ 101

Total Credits: 04 (Theory: 3, Practical; 1)

Total Hrs: Theory: 45, Practical: 30

PH-MJ 101 (Theory)

Unit1	**Vector Analysis (Vector Analysis by Murray Spiegel, Schaum's Outline,2nd Ed.McGraw-Hill,2009)**
	Dot or scalar product, Cross or vector product, Triple product, reciprocal sets of vectors (Ch. 2), Ordinary derivatives of vectors, space curves, continuity and differentiability, differentiation formulae, Partial derivatives of vectors, differentials of vectors, differential geometry (Ch. 3), The vector differential operator del, the gradient, the divergence and the curl, formulae involving del, invariance (Ch. 4) Ordinary integrals of vectors, line integrals, surface integrals and volume integrals (Ch. 5), The divergence theorem of Gauss, Stokes' theorem, Green's theorem in the plane(statements only)
Unit2	**Force, Newton's laws and Momentum (Physics by Halliday,Resnick and Krane,Vol.1, 5th Ed. Wiley)**
	Classical Mechanics (3.1), Newton's first law (3.2), Force (3.3), Mass (3.4),Newton'ssecondlaw(3.5),Newton'sthirdlaw(3.6),Weightandmass(3.7),Applicationsof Newton's laws in one dimension (3.8) Motion in three dimensions with constant acceleration (4.1), Newton's laws in three dimensional vector form (4.2), Projectile motion (4.3), Drag forces and the motion of projectile (4.4), Uniform circular motion (4.5), Relative motion (4.6)Collisions(6.1),Linear momentum(6.2),Impulse and momentum(6.3), Conservation of momentum (6.4), Two-body collisions (6.5)
Unit3	**Systems of particles (Physics by Halliday, Resnick and Krane, Vol. 1, 5thEd.Wiley) & Elasticity I (Properties of Matter by D. S. Mathur, S. Chand & Co.,2009)**
	Systems of particles: Two particle systems (7.2), many particle systems (7.3), centre of mass of solid objects(7.4),conservation of momentum in a system of particles (7.5),system of variable mass (7.6) **Elasticity:** Introduction (8.1), Load, stress and strain (8.2), Hooke's law (8.3), ductility, brittleness and plasticity (8.4), elastic behavior of solids in general(8.5), factors affecting elasticity (8.7), three types of elasticity (8.8), equivalence of a shear to a compression and an extension at right angles to each other (8.9), deformation of a cube – bulk modulus (8.12), modulus of rigidity (8.13), Young's modulus (8.14),relations connecting the elastic constant(8.15),Poisson's ratio(8.16), relations for K and η in terms of Poisson's ratio (8.17),limiting values of σ (8.18)

ReferenceBooks:

1. Mathematical Methods for Physics and Engineering by Riley, Hobson and Bence,Cambridge UniversityPress, 1998.
2. Mechanics (Berkley Physics Course 1 by C Kittle, W D Knight, M. Alvine and A.Ruderman,Tata McGraw-Hill, 1991.
3. UniversityPhysics byYoungand R.Freedman, Pearson 13th Ed., 2013.