CORE COURSE - I
PROPERTIES OF MATTER AND ACOUSTICS

Semester: I   **Max.Marks:75**
Course Code: 21UPH1C1   **Credit: 5**
Total Periods: 90Periods   **Exam Hours:3 hours**

Objective:
- To understand the fundamental of gravitation and study the concepts of elasticity, viscosity, surface tension and various methods, and to apply the knowledge of ultrasonic and acoustics.

UNIT-I: Gravity and Gravitation   **(18pds.)**

Kepler's law - Laws of Gravitation - Determination of' 'G' by Cavendish method, Boy's method-Acceleration due to gravity - Compound pendulum -Bar pendulum, Kater's pendulum-Variation of 'g' with altitude & latitude - Gravitational potential – Gravitational potential energy - Gravitational field at a point due to spherical shell, Uniform solid sphere, Hollow sphere and Thin Circular Plate.

UNIT- II: Elasticity   **(18pds.)**

Hooke's Law – Stress – Strain diagram – Elastic Modulii – Work done in deforming a body – Relation between elastic constants – Poisson's Ratio – Expression for Poisson ratio in terms of elastic constants. Twisting couple on a cylinder – Rigidity modulus by static torsion – Tensional pendulum – determination of rigidity modulus of a wire.

UNIT- III: Surface Tension   **(18pds.)**

Surface tension-Explanation-Examples - Surface Energy - Angle of contact - Experimental determination -determination of surface tension using capillary method, Quincke's method, Searle's Torsion Balance, 'U' tube method - Vapour pressure over flat and curved surface - Jaeger's method .

Unit-IV: Viscosity   **(18pds.)**

Stream Line and turbulent motion - Energy of a Liquid in motion - Bernouli's theorem – Applications - Venturimeter -Carburettor- Viscosity - Poiseuille's formula -Correction for Poiseuille'smelhod-Determination of viscosity using Stoke's method and Poiseuille's method.

UNIT –V: Ultrasonics and Acoustics: **(18pds.)**

Ultrasonic- Piezo-electric effect-Piezo- electric generator-Magneostriction effect- Magnetostriction oscillator-Detection and application of ultrasonic-Acoustics-Reverberation time and its measurement- Sabine's formula-Absorption coefficient and its determination-Condition for good acoustical design of an auditorium- Noise and its measurement- Noise reduction sound Insulation.

Course Outcomes:
- Understand the concept of gravitational field for different shaped material
- Acquire knowledge the relation between the elastic constant
- Understand the concept to measure the surface tension of the liquid
- Acquire knowledge to Deal with liquids based on their viscosity
- Understand the concept the absorption and reflection of sound by various materials and describe the requirements for good architectural acoustics.

BOOKS FOR STUDY:

1.Properties of matter – BrijlalSubramanian.S. Chand & Co.,.

2. Waves and Oscillations – Subramanyam and Brijlal – Vikas Publishing House Pvt. Ltd, New Delhi.

3. Properties of matter and Acoustics – R.Murugesan

BOOKS FOR REFERENCE:

1. DS Mathur, Properties of Matter, S Chand, New Delhi, 2006.

2. Properties of Matter- T. Murugesan, Prasad Publications, Madurai.

Semester: I	**Max.Marks: 60**
Course Code: 21UPH1C2P	**Credit: 3**
Total Periods: 60 Periods	**Exam Hours:3 hours**

Objective:

- To acquire basic understanding of laboratory technique and to educate students in the field of Physics.

LIST OF EXPERIMENTS:

1. Mesurement of length and diameter using vernire caliper, screw gauge and radius of capillary tube using travelling microscope.
2. Sonameter verification of law's
3. Surface Tension and interfacial surface tension by drop weight method.
4. Surface Tension – capillary rise method
5. Convex lens - f, R and m.
6. Concave lens - f, R and m.
7. Non – Uniform bending – Pin and microscope.
8. Non – Uniform bending – Optic lever.
9. Determination of 'n' and M.I using Torsion Pendulum.
10. Static torsion

Books for reference:

1. Practical Physics-S.Somasundaram, V.Balachandran, S.Padmanathan
2. A Text Book of Practical Physics – M.N.Sirnivasan, S.Balasubramanian, R.Ranganatha

CORE COURSE- III
MECHANICS AND RELATIVITY

Semester: II   **Max.Marks: 75**
Course Code:21UPH2C3   **Credit: 5**
Total Periods: 90Periods   **Exam Hours:3hours.**

Objective:
- To understand the fundamental of Mechanics, law of Mechanics and to apply the relativity theory.

UNIT-I: Impact and Projectile   **(19pds.)**
Impact- Definition of impulsive restitution- Laws of impact - coefficient of restitution - Impact of smooth sphere on a smooth horizontal plane - Direct impact between two smooth spheres - Loss of Kinetic energy - oblique impact between two smooth spheres-motion of two interacting bodies-reduced mass.Projectile - the path of a projectile - Range on an inclined plane.

UNIT-II: Rigid Body Dynamics   **(15 hrs.)**
Equation of motion of rotating rigid bodies – General theory of moment inertia i) Perpendicular axis theorem ii) Parallel axis theorem - Radius of gyration - Kinetic energy of rotation - physical significance of moment of inertia- moment of inertia of a thin spherical shell -hollow sphere and solid sphere.

UNIT-III: Kinetics and Dynamics   **(19pds.)**
Simple harmonic motion - Energy of a harmonic oscillator - average values of kinetic and potential energies of a harmonic oscillator - some example of SHM - simple pendulum - the compound pendulum-period of oscillation minimum period - Interchangeability of center of oscillation and centre of suspension - Bar pendulum - measurement of "g" from graph.

UNIT-IV: Hydrodynamic   **(18pds.)**
Hydrodynamic - Equation of continuity - Eulers Equation for unidirectional flow-Toricellio's Theorem-proof -Classical mechanics - Mechanics of single particle statement of theorems of conservation of linear momentum, Angular momentum and Energy, constraints - classification -generalized coordinates.

UNIT-V: Relativity   **(19pds.)**
Relativity - General Theory - Frames of Reference -Newtonian relativity-Galilean transformation equation - Ether hypothesis - Michelson Morley Experiment - Explanation of the negative result. Postulates of special theory of relativity- Explanation - Lorentz transformation equations - derivation - Length contraction-Time Dilation-Relativity of simultaneity—addition of velocities - Variation of mass with velocity - mass - energy equivalence.

Course outcomes:
- Acquire knowledge about the motion of the two interacting bodies
- Understand the moment of inertia of different shaped bodies.
- Have knowledge of the fundamentals of harmonic oscillator models.
- Know about the conservation of energy, linear and angular momentum.
- Learn about the concepts of length contraction and time dilation

Books for study:

1. Mechanics, D.S.Mathur,S.Chand& Co.

2. Mechanics, Narayanamooithy, National Publication House.

Books for References:

3. Mechanics, Subramaniyam et al, S.Viswanthan& co.

4. Classical Mechanics, H.Goldstein, Narosa Publishing House, IInd Editions, 1990.

CORE COURSE- IV
MAJOR PRACTICAL – II (General)

Semester: II   **Max.Marks: 60**
Course Code:21UPH2C4P   **Credit:3**
Total Periods: 60Periods   **Exam Hours:3 hours**

Objective:
- To acquire basic understanding of laboratory technique and to educate students in the field of Physics.

LIST OF EXPERIMENTS:

1. Spectrometer – refractive index of a solid prism.
2. Carey Foster's bridge – Resistance determination.
3. Field along the axis of a coil – deflection magnetometer
4. Determination of gravity (g) and radius of gyration (K) using Compound Pendulum.
5. Determination of Young's modulus of the given material bar by uniform bending using pin and microscope method.
6. Determination of Young's modulus of the given material bar by uniform bending using Optic lever.
7. Determination of Specific Resistance - using Meter Bridge.
8. Potentiometer – ammeter calibration.
9. Post office box-determination of temperature coefficient.
10. Determine the coefficient of viscosity of a liquid by stokes method .

Books for reference:

1. Practical Physics-S.Somasundaram, V.Balachandran, S.Padmanathan
2. A Text Book of Practical Physics – M.N.Sirnivasan, S.Balasubramanian, R.Ranganatha