Foundation of Physics
S.Y. B.Tech. (Direct SY)
Course code: PH16001 (FP)

Teaching Scheme
Lectures : 3hrs/week

Examination Scheme
Mid Sem: 30, Quiz: 20 marks
End-Sem Exam- 50 marks

Unit 1   **[7 Hrs]**
Oscillations, Waves & Light
SHM, characteristics of SHM, Waves, Travelling waves and its equation**,** Types of waves, Principle of Superposition, Stationary waves**,** Light as an EM Wave, graphical representation of EM wave, Interference of light due to thin film (uniform thickness), Antireflection coating, Total Internal reflection, Introduction to Optical fiber and its design.

Unit 2   **[6 Hrs]**
Atomic Nucleus and Nuclear energy
Atomic Nucleus, Nuclear force, Static properties of nucleus, Mass defect and Binding energy, Law of radioactive decay, Half-life, Applications of radioactivity, Nuclear reactions, Q-value of nuclear reaction, Nuclear fission, chain reaction and Nuclear energy.

Unit 3   **[6 Hrs]**
Electrostatics
Coulomb's law in vector form ,the electric field, Continuous charge distribution (Line, Surface& Volume)**,** Divergence of E, application of Gauss's law (simple 2 D problems)**,** The curl of E (Faraday's Law), the concept of electric potential V, Potential due to continuous charge distribution.

Unit 4   **[5 Hrs]**
Magneto statics
Steady state current (line current, Surface current and volume current), current densities, Magnetic field due to steady current (Biot-Savart's law), divergence and curl of B, Statement of Ampere's Law (with simple examples).

Unit 5   **[5 Hrs]**
Elements of Thermodynamics
Concept of Temperature, Terminology in Thermodynamics, Thermodynamic work, Caparison for Heat and Work, First Law and its applications, Heat engine and Thermal efficiency, Second law, Entropy, Disorder of system, Third law and Principle of Unattainability Absolute Zero (Nernst's Theorem).

Unit 6   **[7 Hrs]**

Modern physics

Drawbacks of Classical Mechanics, Plank's quantum hypothesis, Dual nature of matter, De-Broglie's hypothesis, light as a particle(Compton's experiment), De-Broglie's wavelength, Heisenberg's uncertainty principle(position and momentum), Wave function, its properties, conditions and its physical significance, Free particle solution of wave function.
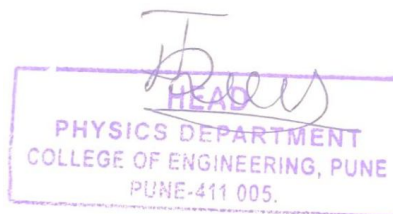
References:

1. Engineering Physics, Avadhanulu and Kshirsagar.

2. Halliday-Resnick (Sixth edition) "Optics", Brij Lal (S. Chand publication)

3. Classical Electrodynamics, David Griffith (Pearson India limited)

4. H .C. Verma & Halliday-Resnick (Sixth edition), B. B. Laud

5. Modern Physics, S. Chand Publication.

6. Concepts of Modern Physics, Arthur Beiser, Tata McGraw – Hill Edition.

Course Outcome:

Students will be able to

➢ Understand classical and wave mechanics to implement for the problems.

➢ Understand of the laws of thermodynamics to implement in various thermodynamic systems and processes.

➢ Understand the basic principles of Electromagnetism and formulate it to solve the engineering problems.

➢ Aware of limits of classical physics and will be able to use it in the appropriate field in order to solve the problems.

Head

Physics Department