College of Engineering Pune, Pune-5
Department of physics
Course Title : Foundation of Physics(AS-205)

Teaching Scheme :
Lectures:3 hrs /week

Examination scheme:
Quiz 1 & 2 -20 each
End sem exam :60

Unit 1 General Mechanics(5)

i)Concept of force,force field,types of forces,potential energy,
ii)Work done(single particle system only); work energy theorem.
iii)Concept of central force,properties of central force field ,its equation of motion.
iv)Laws of planetary motion (Kepler's laws with derivation).

Unit 2 Waves motion & Optics(6)

i)Types of waves,general equation of traveling wave
ii)Superposition principle ,formation of stationary waves (with derivation).
iii)Light as an EM wave,graphical representation of EM wave,
Superposition principle in case of light wave
iv)Huygen's Principle, Young's double slit experiment,
v)interference of light due to thin film(uniform thickness) ,condition for darkness and brightness.

Unit 3 Electrostatics (6)

i)Coulomb's law in vector form ,the electric field ,
ii)Continuous charge distribution(Line,Surface&Volume)
iii)Introduction to Gauss's law,integral form of Gauss's law.
iv)Applications of Gauss's Law to simple 2 D-3D problems only.
v)Faraday's Law,integral form of Faraday's law, concept of electric potential(V),
vi)Potential(V) due to continuous charge distribution.

Unit 4 Magnetostatics(4)

i)Steady currents(line current ,surface current,volume current)& current densities.
ii)Magnetic field due to steady currents (Biot-Savert's law),
iii)Line integral of B over a closed loop.
iv)closed surface integral of B(Non-existence of magnetic monopole)
v)Ampere's Law and its applications to simple problems.

Unit 5 Thermodynamics(4)

i)Heat as a form of energy (Joule's constant),Types of Systems.
ii)Zeroth's law , first law & its mathematical statement
iii)Second law and concept of entropy,third law thermodynamics.
iv)Reversible and irreversible processes with examples

Unit 6 Modern physics(5)

i)Drawbacks of classical mechanics,Plank's quantum hypothesis.
ii)Dual nature of matter,De-broglies hypothesis,light as a particle(Compton's experiment)
iii)De-Broglies wavelegth, Heisenberg's uncertainty principle(position and momentum).
iv)Wave function ,its properties,conditions and its physical significance.

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References:

Unit 1: Classical Mechanics by P.V. Panat,
H.C.Verma, Halliday -Resnick(Sixth edition)

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

Unit 3 &4: Classical Electrodynamics by David Griffith(Pearson India limited)

Unit 5 H .C. Verma &Halliday-Resnick (Sixth edition) ,B.B.Laud

Unit 6 Halliday-Resnick (Sixth edition)