PH 101: Physics (3-1-0: 4)

Mechanics: Vector Calculus, Revisiting Newton's laws of motion, Motion along a straight line, Motion in 2D and 3D, work and kinetic energy, Potential energy and energy conservation, momentum, impulse, and collisions, Rotation of rigid bodies. [10L+3T=13]

Electromagnetism: Gauss's law and its applications, Divergence and curl of electrostatic fields, Electrostatic potential. Lorentz force, Biot-Savart and Ampere's laws and their applications, Divergence and curl of magnetostatic fields, Force and torque on a magnetic dipole. Motional EMF, Faraday's law, Lenz's law, Maxwell's equations. [10L+3T=13]

Optics: Interference - Coherence, Principle of Superposition, Young's double slit experiment, Newton's rings. Diffraction - Fresnel and Fraunhofer diffracting, Grating and its usages; Polarization- Introduction, Malus' law, Polarization by reflection and Brewster's law. [10L+3T=13]

Modern Physics: Old quantum theory, black body radiation, Planks law, photoelectric effect, Compton effect, de-Broglie's hypothesis, Heisenberg uncertainty principle, wave packet, group and phase velocities, postulates of quantum mechanics. Schrödinger's equation, application in 1-dimension: particle in a box. [10L+3T=13]

Textbooks

1. R. A. Serway and J. W. Jewett, "Physics for Scientists and Engineers with Modern Physics", CENGAGE Learning Custom Publishing, 9th edition, 2012.
2. M. Mansfield and C. O'Sullivan, "Understanding Physics", Wiley-Blackwell; 2nd Edition, 2010.
3. R. Shankar, "Fundamentals of Physics I & II", Yale University Press, 1st edition, 2016.
4. J. C. Morrison, Modern Physics for Scientists and Engineers, Elsevier; 1st edition, 2011.