

Department of Physics
SEMESTER – IV(UG/SHPHS/C-9) CORE-T-9
Elements of Modern Physics
Credit-4; Full Marks: 25
Subject Teacher: DR BIPUL SARKAR
SYLLABUS UNITIZATION

Month	Week	Topics to be taught
March	2	Planck's quantum, Planck's constant and light as a collection of photons; Blackbody Radiation: Quantum theory of Light
March	3	Photo-electric effect and Compton scattering. De Broglie wavelength and matter waves;
March	4	Davisson-Germer experiment. Wave description of particles by wave packets.
April	1	Group and Phase velocities and relation between them. Two-Slit experiment with electrons
April	2	Probability. Wave amplitude and wave functions.
April	3	Class Test
April	4	Position measurement- gamma ray microscope thought experiment; Wave-particle duality
May	1	Heisenberg uncertainty principle (Uncertainty relations involving Canonical pair of variables): Derivation from Wave Packets impossibility of a particle following a trajectory;
May	2	Estimating minimum energy of a confined particle using uncertainty principle; Energy-time uncertainty principle-application to virtual particles and range of an interaction
May	3	Two slit interference experiment with photons, atoms and particles
May	4	linear superposition principle as a consequence; Matter waves and wave amplitude;
June	1	Schrodinger equation for non- relativistic particles; Momentum and Energy operators; stationary states
June	2	Physical interpretation of a wave function, probabilities and normalization
June	3	Probability and probability current densities in one dimension.
June	4	Class Test