

CURRICULUM PLAN 2025-26

Odd Semester: I, III, V

Mr. Kapil Kumar

Department of Physics

B.Sc. (H) – 4th Year, VII Sem, DSE Paper: - Nanoscience

Content	Allocation of Lectures	Month-wise Schedule followed	Tutorial/assignment/ presentation etc
Nanoscience			
Unit -3 Properties of Nano-Scale Systems Time and length scales (diffusion, elastic, and inelastic lengths, etc.) of electrons in nanostructured materials, Carrier transport in nanostructures: diffusive and ballistic transport. 2D nanomaterials: Conductance quantization in 2DEG in GaAs and integer quantum hall effect (semi-classical treatment) 1D nanomaterials: Conductance quantization in 1D structures using split gate in 2DEG system (Qualitative). 0D nanomaterials: Charging effect, Coulomb Blockade effect, Single Electron Transfer (SET) device. Basic understanding of excitons in semiconductors and their	10	1August-15 October	Syllabus Overview Reference books Problem-solving Derivations and Numerical.

consequence on optical properties of the material			
Unit 5: Preparation of colloidal solutions of Metals, Metal oxides Nanoparticles, Micro Electromechanical Systems (MEMS), Nanoelectromechanical Systems (NEMS). Applications of nanomaterials as probes in medical diagnostics and targeted drug delivery, sunscreen, lotions, and paints, and other examples, to give a broader perspective of applications of nanomaterials.	5	15 October to 30 November	Derivations and Numerical Class test on unit end Discussion of Important questions