DHARAMPETH M. P. DEO MEMORIAL SCIENCE COLLEGE, NAGPUR

B. Sc. (Physics) SEMESTER-V

Paper-II (Quantum mechanics, Nanomaterials and Nanotechnology)

Unit I

Quantum mechanics- Failure of classical physics to explain black body spectra
https://youtu.be/uinSHhvgpKc?feature=shared

Planck's radiation law
https://youtu.be/6URHSOcvxIQ?feature=shared

Compton Effect,
https://youtu.be/hzwykQ7KSRE?feature=shared

Wave particle duality,
https://youtu.be/Q2OlsMblugo?feature=shared

de Broglie's hypothesis,
https://youtu.be/1mwgcbJ3BlQ?feature=shared

Concept of wave and group velocity Experimental demonstration of matter waves
https://youtu.be/EIqKG5TiSYs?feature=shared

Davisson and Germer experiment,
https://youtu.be/Ho7K27B_Uu8?feature=shared

Heisenberg's uncertainty principle
https://youtu.be/a8FTr2qMutA?feature=shared

Thought experiment
https://youtu.be/nz11b5mkNGQ?feature=shared

Unit II

Quantum mechanics- Schrodinger's equation (Time dependent and independent equations),
https://youtu.be/lBBiiORrlCw?feature=shared

Physical significance of wave function Ψ, Operators, Expectation values of a dynamical quantities,
https://youtu.be/w9Kyz5y_TPw?feature=shared

Ehrenfest's theorem, Eigen value and Eigen functions, Particle in a box,
https://youtu.be/huoY4JJp-uk?feature=shared

Application to free particle in a one and three dimension.
https://youtu.be/bHdD85i527g?feature=shared

Unit III

Nano materials-Introduction to Nano science and Nanotechnology, Difference between nanomaterial and bulk materials
https://youtu.be/NNoAWz12VL4?feature=shared

Reduction of dimensions 3D, 2D, 1D, 0D materials, various morphologies of nanomaterials,
https://youtu.be/1_M8FdYJJ2c?feature=shared

Bottom up and top down approaches, size dependent physical properties, Nano cluster.
https://youtu.be/iOggL0Uurlw?feature=shared

Unit IV

Nanotechnology- Different methods of synthesis of nanomaterials (Wet chemical, Sol-gel, and HCR Technique)
https://youtu.be/3XpuoVVzT1A?feature=shared

Determination of size of nanoparticles by particle analyzer(BET) and Debye- Scherer's formula
https://youtu.be/kBeI63gLnIk?feature=shared

Characterization technique of SEM and TEM , application of nanomaterials in various fields (General).
https://youtu.be/qvIWpLSzRhs?feature=shared