

## JNU M.Sc Syllabus

**Mathematical Physics:** Linear vector space; matrices; vector calculus; linear differential equations; Fourier analysis.

**Classical Mechanics:** Conservation laws; central forces, Kepler problem and planetary motion; mechanics of system of particles; rigid body dynamics; moment of inertia tensor; special theory of relativity – Lorentz transformations, mass-energy equivalence.

**Electromagnetic Theory:** Solution of electrostatic and magnetostatic problems including boundary value problems; dielectrics and conductors; BiotSavart's and Ampere's laws; Faraday's law; Maxwell's equations; scalar and vector potentials; Electromagnetic waves and their reflection, refraction, interference. Poynting vector, Poynting theorem.

**Quantum Mechanics:** Physical basis of quantum mechanics; uncertainty principle; Schrodinger equation; one, two and three dimensional potential problems - particle in a box, harmonic oscillator, hydrogen atom.

**Thermodynamics and Statistical Physics:** Laws of thermodynamics; macrostates and microstates; phase space; free energy, calculation of thermodynamic quantities; black body radiation and Planck's distribution law; classical statistics.

**Atomic and Molecular Physics:** Spectra of one- and many-electron atoms; LS and jj coupling; Zeeman and Stark effects; X-ray spectra; lasers.