

Ph.D. ENTRANCE TEST SYLLABUS

Physics: Newtonian Mechanics and Rigid body dynamics; Lagrangian and Hamiltonian Approach; Electromagnetic Field and Dynamics of Charged particles, Propagation of Electromagnetic waves and Gauge transformation; Basics in Quantum Mechanics- Wave-Particle duality, Schrodinger Equation, Eigen value problems, motion in a central potential- orbital angular momentum , angular momentum algebra, spin etc.; Perturbation theory and Variational Principle; Classical and Quantum statistics; Phase transition; Laser and Coherence; Nuclear models and Radioactivity .

Electronics & Communication: Semiconductor devices; Operational Amplifier and Digital Electronics- operational amplifiers and applications, Digital techniques and applications (registers, counters, comparators and similar circuits); Digital Converters and Microprocessors- A/D and D/A converters, Microprocessor and Microcontroller Basics; Computer Architecture, System Design; Signals, noise, modulation and demodulation; Introduction to Data Communication and Networking- Data communications Network Architecture, Protocols and Standards, Layered network Architecture, Serial and Parallel Data transmission; Optical Fiber transmission; Digital Transmission; Multiplexing and T carriers; Wireless Communication Systems; Data Communications codes, error control; Communication Networks; The Public telephone network; Cellular communication Concepts.

Mathematics: Set theory and Real number systems; Matrices and vector space; Linear Differential equations and Special Functions; Fourier Series, Fourier transform, Laplace transform; Complex Analysis; Probability & Statistics- Discrete and continuous Probability, Random variables and distribution functions; Central limit theorems (i.i.d, case); Markov chains with finite and countable state space; Poisson and Birth – and – death Processes; Standard Errors; Numerical methods; Group theory; Graph theory; Queuing theory- MM1 systems, multi- servers, multi queue networks .