

IIIT Hyderabad SPEC Exam Pattern

IIIT Hyderabad SPEC Exam Pattern	
Mode of Exam	Computer-Based Test
Exam Duration	60 minutes
Types of Questions	Objective-Based Test (MCQ)

IIIT Hyderabad SPEC Syllabus

Physics Syllabus

- Electricity and Magnetism
- Alternating currents
- Amperes law
- Biot-Savart law
- Capacitors
- Conductors
- Coulombs law
- Dielectric polarization
- Dielectrics
- Displacement current
- Electric field and potential
- Electrostatic boundary conditions
- Electrostatic energy
- Faraday's law of electromagnetic induction
- Gauss's law
- Lorentz Force and motion of charged particles in electric and magnetic fields
- Maxwell's equations and plane electromagnetic waves
- Poynting's theorem
- Reflection and refraction at a dielectric interface
- Self and mutual inductance
- Simple DC and AC circuits with R, L and C components
- Solution of Laplace's equation for simple cases

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- Transmission and reflection coefficients
- Volume and surface charges
- Kinetic Theory and Thermodynamics
- Reversible, irreversible and quasi-static processes
- Carnot cycle
- Elements of Kinetic theory of gases
- First law and its consequences
- Ideal gas
- Isothermal and adiabatic processes
- Laws of thermodynamics
- Maxwell's thermodynamic relations and simple applications
- Mean free path
- Phase transitions and Clausius-Clapeyron equation
- Second law and entropy
- Specific heat of Mono-, di- and tri-atomic gases
- Thermodynamic potentials and their applications
- Van-der-Waals gas and equation of state
- Velocity distribution and Equipartition of energy
- Zeroth law and concept of thermal equilibrium
- Oscillations, Waves and Optics
- Damped and forced oscillators
- Differential equation for simple harmonic oscillator and its general solution
- Diffraction gratings
- Doppler Effect
- Double refraction and optical rotation
- Energy density and energy transmission in waves
- Fermat's Principle
- Fraunhofer diffraction
- General theory of image formation
- Group velocity and phase velocity
- Interference of light, optical path retardation
- Linear, circular and elliptic polarization
- Rayleigh criterion and resolving power
- Resonance
- Sound waves in media
- Superposition of two or more simple harmonic oscillators
- Thick lens, thin lens and lens combinations
- Travelling and standing waves in one-dimension
- Wave equation

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- Mechanics and General Properties of Matter
- Bernoulli's theorem
- Capillarity
- Centre of mass
- Centrifugal and Coriolis forces
- Conservation of energy
- Conservation of linear and angular momentum
- Conservative and non-conservative forces
- Elastic and inelastic collisions
- Elasticity
- Equation of continuity
- Equation of motion of the CM
- Eulers equation
- Gravitational Law and field
- Hooke's law and elastic constants of isotropic solidKeplers laws
- Kinematics of moving fluids
- Moments of Inertia and Products of Inertia
- Motion under a central force
- Newtons laws of motion and applications
- Principal moments and axes
- Rigid body motion, fixed axis rotations
- Rotation and translation
- Stress energy
- Surface tension and surface energy
- System of particles
- Uniformly rotating frame
- Variable mass systems
- Velocity and acceleration in Cartesian, polar and cylindrical coordinate systems
- Viscous fluids
- Solid State Physics, Devices and Electronics
- Crystal structure
- Bravais lattices and basis
- Miller indices
- X-ray diffraction and Braggs law
- Einstein and Debye theory of specific heat
- Free electron theory of metals
- Fermi energy and density of states
- Origin of energy bands
- Concept of holes and effective mass

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- Elementary ideas about dia-, para- and ferromagnetism
- Langevin's theory of paramagnetism
- Curies law
- Intrinsic and extrinsic semiconductors
- Fermi level
- OR, AND, NOR and NAND gates
- Transistors
- P-N junctions
- Amplifier circuits with transistors
- Transistor circuits in CB, CE, CC modes
- Operational amplifiers

Maths Syllabus

- Ratio Proportion
- Linear Equations
- Basic Geometry
- Quick Calculations
- Properties of Numbers
- Average
- Percentages

Chemistry Syllabus

- Some basic concepts of chemistry
- The p-Block Elements
- The d and f Block Elements
- Coordination Compounds
- Haloalkanes and Haloarenes
- Thermodynamics
- Equilibrium
- Redox reactions
- The Solid State Solutions
- Electrochemistry
- Chemical Kinetics
- Structure of atom
- Classification of elements & periodicity in properties
- Chemical bonding and molecular structure
- States of matter
- Surface Chemistry

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- General Principles and Processes of Isolation of Elements