भारतीय प्रौद्योगिकी संस्थान तिरुपति
INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
एर्पेडु-वेंकटगिरि रोड, एर्पेडु पोस्ट, तिरुपति जिला, आ प्र - 517619
Yerpedu – Venkatagiri Road, Yerpedu Post, Tirupati District, A.P – 517619

Tel: +91 877 250 3532 ADMISSIONS Email: admissions@iittp.ac.in

Syllabus for M.S.(R) & Ph.D. Written test/ Interview – January 2026 semester

Department of Electrical Engineering Semiconductor Devices

Engineering Mathematics: Linear Algebra, Differential and Integral Calculus, Plotting functions, Finding Maxima & Minima.

Circuit Analysis: Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem, reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer. Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform, Linear 2-port network parameters.

Electronic Devices: Energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors. Carrier transport: diffusion current, drift current, mobility and resistivity, generation and recombination of carriers, Poisson and continuity equations. P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photo diode and solar cell.

Analog Circuits: Diode circuits: clipping, clamping and rectifiers. BJT and MOSFET amplifiers: biasing, ac coupling, small signal analysis, frequency response. Current mirrors and differential amplifiers. Op-amp circuits: Amplifiers, summers, differentiators, integrators, active filters.

Digital Circuits: Number representations: binary, integer and floating-point-numbers. Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders. Sequential circuits: latches and flip-flops, counters, shift-registers, finite state machines, propagation delay, setup and hold time, critical path delay.