

## 1. Electronics and Communication Engineering

**Network Theory:** Node Analysis, Mesh Analysis, Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity Theorem, Wye-Delta Transformation, Two Port Network Parameters, Steady State Analysis of R,L,C, Circuits

**Analog Electronics:** Intrinsic and Extrinsic Semiconductors, Energy bands, Diffusion and Drift Currents, Mobility, Equation of Continuity, P-N Junction diode, Zener Diode, Light Emitting Diode (LED), Photodiode, Clipping and Clamping Circuits, Rectifiers, Filters, BJTs & MOSFETs with their Biasing and Small Signal Analysis, Op-amp Circuits and their Applications like Adder, Integrator, Differentiator and Differential Amplifier

**Digital Circuits:** Number System, Boolean Algebra, Logic Gates, K-Map, Multiplexers, Demultiplexers, Encoders, Decoders, Code Converters, Flip-Flops, Counters, Registers, ADCs and DACs, Computer Organization: Addressing Modes, Internal Architecture of 8085 Microprocessor, Pipelining, Virtual Memory, Cache Memory and Mappings.

**Signals and Systems:** Classification of Signals, Classification of various Systems, LTI Systems, Impulse Response, Poles and Zeros, Convolution and Correlation, Fourier Series, Fourier Transform, DTFT, DFT, Z-Transform, Laplace Transform, Sampling Theorem, FIR and IIR Filters, Multi-rate Digital Signal Processing

**Communication Systems:** Amplitude Modulation and Demodulation, Angle Modulation and Demodulation, Noise, Noise Figure, White Noise, Random Variables and Processes, Power Spectral Density, Entropy, Channel Capacity, Error Detection and Correcting Codes, Cyclic Codes, Multiple Access Techniques, PCM, DPCM, Line Coders, DM, ADM, ASK, FSK, PSK, QAM, Intersymbol Interference, Matched Filter, Gram Schmitt Orthogonality

**Electromagnetic Theory:** Gauss's Law in Electrostatics and Magnetostatics, Boundary Conditions for Dielectrics, Faraday's Law of EM Induction, Ampere's Law, Maxwell's Equations and their Differential & Integral Forms, Wave Equations, Poynting Theorem  
Uniform Plane Waves, Reflection and Refraction, Phase Velocity, Group Velocity, Wave Propagation in Conductors and Dielectrics, Depth of Penetration  
Transmission Line Equations, Impedance Matching, Smith Chart

**Control Systems:** Open Loop and Closed Loop Systems, Transfer Function, Block Diagram Reduction and Signal Flow Graphs, Routh-Hurwitz Criterion, Bode Plot, Root Locus Plot, Polar Plot, Nyquist Stability Criterion, Lag, Lead and Lag-Lead Compensators, State variables, State Equations and their Solutions