Electronics and Telecommunication Engineering- Syllabus	
	Signals and Systems **Signals**: Introduction, Types of signals, Continuous-time and discrete time signals. Continuous-time and Discrete time systems and Basic system properties. **Linear time-invariant systems:** Discrete and Continuous time systems, convolution sum, convolution Integral, Properties, causal LTI systems described by difference equations, singularity function. **Representation of periodic signal by Fourier:** Continuous-time and discrete-time signals, Properties **Representation of aperiodic signals by Fourier Transform:** Continuous-time and discrete-time signals, Properties, System characterized by linear constant coefficient differential equation. **Z-transform:** The region of Convergence, Inverse z-transform, pole zero plot, Properties of z-transform, Analysis and characterization of LTI system using z-Transform. **Sampling:** representation of Continuous-time signals by its samples, sampling theorem, Impulse train sampling, Sampling with zero order hold, Reconstruction of signal from its samples using interpolation, Aliasing. Discrete time processing of continuous time signals, Digital differentiator, half sample delay, Sampling of Discrete-time signals, Decimation and interpolation. **Random signals:** review of probability theory. **Random variable:** Continuous and Discrete, Description of Continuous Random variable, Statistical averages. Description of Discrete Random variable, Statistical averages. **Random processes:** definition, properties and types.
2	**Electromagnetic Theory** Overview of electrostatics and magnetostatics. **Laplace and Poission's equation**, Solution of Laplace equation by separation of variables in Cartesian, cylindrical and spherical co-ordinates, cylindrical and spherical harmonics, Examples. **Maxwell's equations** for static fields, their modifications for time-varying fields conducting and dielectric media. EM Wave equations and uniform plane waves, in free space and in lossy medium, g, a, b, l, vp, vg, and h, wave propagation in good dielectrics, in good conductors: Depth of penetration, Poynting vector and power flow, Reflection and refraction of EM Waves. **Transmission lines :** Transmission line equations, Parameters- primary and secondary constants, Reflection coefficient and SWR, Metched Transmission line, Impedance matching, Smith chart, problems, Analogy of transmission lines with e.m. waves.
3	**MEASUREMENT & INSTRUMENTATION.** Principle of measurement and error analysis. Electrical instruments: DC & AC voltage and current meters, power and energy meters, extension of instrument ranges, potentiometers and bridges: Measurement of inductance and capacitance, Measurement of low, medium and high resistances, Electronic instruments for V,.I,.Z, Q, P, frequency and phase. Instrument Transformers and their application, Measurement of speed frequency and power factor, Introduction to transducers, Harmonic Analyzer and Power Analyzer, Transducers

4	**Electronic Circuits Design** Eber's MoLL equation & its application Two transistor amplifier stages (CC-CE, CC-CC and Darlington configurations. Cascode configuration). Large and small signal behavior of Emitter-coupled and source- coupled Paris (used in differential amplifier). Transistor current sources (simple current source , Widlan & Wilson current source) current source & Active locals. Level shifting, bias considerations. CE, CB & Emitter follower as output stages, Analysis of Monolithic OP AMPS. Design Considerations, Effect of bias current and input offset, band width and slewrate. Differentiate amplifiers : CMRR, Operational amplifiers, Application of OP AMP circuits: Summer Integrator, current converter instrumentation amplifier, non linear OP-AMP circuits, precisom rectifier linear half wave and full wave rectifier, sample and hold circuits, OP-AMP as comparator, Schmitt trigger, square and triangular wave generator log and antilog amplifiers, analog multipliers, capacitance multiplier, simulation of inductance using OP-AMP, zero crossing detector, Active filters. Oscillators : Phase shift, wein bridge and tuned oscillator.
5	**Communication Systems** (1) Review of Signal Representation using Fourier series & Fourier Transforms. Power spectral density, Random signal theory, Random Variables, Random processes, Stationary, Time Averages and Ergodicity. (2) Analog Signal Transmission: Modulation (3) Amplitude Modulation: Equation for am wave, Modulation Index and Power relationships. (4) AM transmitter: Generation of AM. (5) AM demodulator: Theory and Mathematical analysis of Square Low detector, Envelope detector and synchronous detector. (6) DSB Modulation: Principle of nonlinear resistance, Balance modulator and Switching Modulator. (7) Generation of SSB Modulation: Filter method, Phase shift method and third method. (8) Time domain representation of SSB signal: Mathematical Derivation (9) SSB demodulator. (10) Frequency and phase modulation, Multiplexed Stereo FM system (11) Generation of Frequency Modulation: Reactance modulator and Indirect method (12) Radio receivers: Tunned radio frequency receiver, Superhetero
6	**Digital Signal Processing** **Review of Continuous** - time signals and systems; Stability, Casuality; Time-invariance; LTI systems; Fourier transform; Properties of Fourier transform; Modulation property; Parseval's relation; Auto-carrelation; Cross-correlation; The energy density spectrum; The power density spectrum. Discrete-time signals and systems, Fourier series representation of discrete-time periodic sequences; Fourier transform representation of discrete-time finite-duration sequences. **Analog filters;** Butterworth filters; Chebyshev filters. **Digital filter structures; IIR filters;** FIR Filters, Recursive filters; Non-recursive filters; Direct form, cascade, and parallel realizations; Linear phase filters. **Design techniques for FIR digital filters;** Bilinear transformation method; Impulse invariance method; Design of FIR filters; Window functions. The discrete Fourier transform (DFT); Computational aspect of DFT; Introduction to discrete Hilbert transforms. Effects of finite register length in digital signal processing; Homomorphic signal processing Power spectrum estimation.

7	Microprocessor and its applications **Introduction to Microprocessors:** Evolution of microprocessors, Register structure, ALU, Bus Organization, Timing and Control. **Architecture of a 16-bit Microprocessor:** Internal organization of 8086, Signal descriptions, Physical memory organization, BIU, EU, Minimum mode 8086 system and timings, Maximum mode 8086 system and timing. **Assembly Language Programming:** Addressing modes, Instruction set, Assembler directives and Operators, Data movement instructions, Arithmetic and logic instructions, Program control instructions, Recursive procedures. **Special Architectural Features and Related Programming:** Stack structure, Interrupts and Interrupt service routine, Interrupt programming, Macros, Timings and delays. **Basic Peripherals and Their Interfacing:** Memory interfacing, Interfacing I/O ports, Programmable Peripheral Interface (8255), Interfacing A/D and D/A converters. **Special Purpose Programmable Peripheral Devices and Their Interfacing:** Programmable Interval Timer (8253/8254), Programmable Interrupt Controller (8259), Keyboard/Display Controller (8279), Programmable Communication Interface (8251), DMA Controller (8237/8257). **Microprocessor Applications**: Interfacing scanned multiplexed displays and Liquid crystal displays, Interfacing matrix keyboard, Stepper motor interfacing, Case studies of microprocessor based systems, Standards for bus architecture and ports. □
8	**VLSI Technology** Carrier concentration, Fermil level Drift of carrier in electrical and magnetic fields. Carrier life time diffusion of carrier. PN Junctions: Equilibrium condition, forward and reverse bias junction, reverse bias breakdown, Metal semiconductor junction. Field effect transistor: Junctions FET, Metal semiconductor FET and MOS FET Transistor. Fundamental of BJT operation minority carrier distribution and terminal currents, Secondary effects in transistor, Kirk effect. Introduction to monolithic integrated circuit. Diffusion.
9	**Control Systems:** Transient and steady state response of control systems; Effect of feedback on stability and sensitivity; Root locus techniques; Frequency response analysis. Concepts of gain and phase margins: Constant-M and Constant-N Nichol's Chart; Approximation of transient response from closed loop frequency response; Design of Control Systems, Compensators; Industrial controllers.