## Course Structure

**Electronics & Control Engineering**

### II B.Tech I Semester

<table>
<thead>
<tr>
<th>Subject Code</th>
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### II B.Tech II Semester

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### COURSE STRUCTURE

#### Electronics & Control Engineering

#### III B.Tech I Semester

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#### III B.Tech II Semester

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II B.Tech, I Semester

10BT3BS03 : SPECIAL FUNCTIONS AND COMPLEX ANALYSIS
(Common to ECE, EEE, EIE & EConE)

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4 1 - 4

Unit-I : PARTIAL DIFFERENTIAL EQUATIONS
Formation of Partial differential equations – Solutions of first order
Partial differential equations using Lagrange’s method. Method of
separation of variables – solutions of one dimensional wave equation
- Heat equation- Two dimensional Laplace equation under boundary
conditions.

Unit-II : SPECIAL FUNCTION
Euler’s Integrals – Beta and Gamma functions - properties-
Relationship between beta and gamma functions- applications -
evaluation of improper integrals using Beta and Gamma functions.
Bessel function: Generating function - Properties of Bessel functions
- recurrence relations, orthogonality.

Unit-III : LIMITS AND CONTINUITY - ANALYTIC FUNCTION
Exponential, Trigonometric, logarithmic, Hyperbolic and general
power (z ^c) - separation of real and imaginary parts – Limits and
Continuity of functions. Differentiability – Analyticity – Cauchy
Riemann equations- conjugate and harmonic conjugate functions
- Milne-Thompson method- potential functions.

Unit-IV: COMPLEX INTEGRATION
Line integral – evaluation of line integrals along curves and closed
contours - Cauchy’s Integral theorem – Cauchy’s integral formula -
Derivatives of analytic function - generalized integral formula. -
Evaluation of integrals using integral formulae.

Unit-V: COMPLEX POWER SERIES
Taylor’s theorem (with proof) - Laurent’s theorem (without proof)
- Taylor and Laurent series expansions of complex functions -
Singularities – types – poles of order m-residues.
Unit-VI: RESIDUE CALCULUS
Residue theorem – proof – applications – evaluation of integrals using residue theorem – evaluation of improper and real integrals of the type

i) \[ \int_{-\infty}^{\infty} f(x) \, dx \]

ii) \[ \int_{-\infty}^{\infty} f(\cos \theta, \sin \theta) \, d\theta \]

iii) \[ \int_{-\infty}^{\infty} e^{\sin \theta} \, d\theta \]

Unit-VII: ROUCHE’S THEOREM - APPLICATIONS

Unit-VIII: CONFORMAL MAPPING
Definitions and examples. Mappings defined by \( w = e^z \), \( \ln z \), \( z^2 \), \( \sin z \), \( \cos z \), Translation, Rotation, Inversion and Bilinear transformation – properties – fixed point – cross ratio – invariance of circles under bilinear transformation – determination of bilinear transformation using three given points.

TEXT BOOKS:

REFERENCE BOOKS:
2. Erwin Kreyszig, Advanced engineering mathematics, 8/e, John-Wiley & Sons, Inc.
II B.Tech, I Semester

10BT30401: SEMICONDUCTOR DEVICES AND CIRCUITS
(Common to ECE, EEE, EIE & EConE)

UNIT-I: PN JUNCTION DIODE

UNIT-II: RECTIFIERS, FILTERS AND REGULATORS
Halfwave rectifier and fullwave rectifiers (Qualitative and quantitative analysis), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, pi-section filter, comparison of various filter circuits in terms of ripple factors. Simple circuit of a regulator using Zener diode. Problems on rectifier circuits.

UNIT-III: BIPOLAR JUNCTION TRANSISTOR
Transistor construction, BJT Operation, Transistor as an amplifier, Transistor currents and their relations, Input & Output Characteristics of a Transistor in Common Emitter, Common Base and Common Collector Configurations, BJT specifications.

UNIT-IV: TRANSISTOR BIASING AND STABILIZATION
Operating Point, DC and AC Load Lines, Importance of Biasing, Fixed Bias, Emitter Feedback Bias, Collector to Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization against Variations in $V_{BE}$ and $\beta$, Bias Compensation Using Diodes and Transistors, Thermal Runaway, Condition for Thermal Stability in CE configuration, Problems on biasing circuits.

UNIT-V: SMALL SIGNAL ANALYSIS OF BJT AMPLIFIERS
BJT Modeling, Hybrid Modeling, Determination of h-Parameters from Transistor Characteristics, Measurement of h-Parameters, Analysis of CE, CB and CC configurations using h-Parameters, Comparison of CB, CE and CC configurations, Simplified Hybrid Model, Millers Theorem, Dual of Millers Theorem.
UNIT-VI: FIELD EFFECT TRANSISTOR
Construction, Principle of Operation and Characteristics of JFET and MOSFET (Enhancement & Depletion), Small Signal Model of JFET & MOSFET

UNIT-VII: FET AMPLIFIERS
Common Source and Common Drain Amplifiers using FET, Generalized FET Amplifier, Biasing of FET, FET as Voltage Variable Resistor, Comparison between BJT and FET.

UNIT-VIII: SPECIAL PURPOSE ELECTRONIC DEVICES

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I: FUNDAMENTALS OF ELECTRICAL CIRCUITS
Concepts of Charge, current, voltage and power: active & passive elements, Reference concepts of direction for voltages & currents, voltage and current relationships for passive elements, Ohm’s law, Kirchoff Laws, current division and voltage division rules; Network reduction techniques, series, parallel, series-parallel circuits, star-delta and delta-star transformations. Source transformation.

UNIT II: BASIC NODAL & MESH ANALYSIS
Basic definitions: Node, Path, Loop, Branch, Nodal analysis and super node concept, Mesh analysis and super mesh concept, Problems.

UNIT III: FUNDAMENTALS OF AC CIRCUITS
Introduction, Advantages of AC supply, types of waveforms, importance of sinusoidal waveforms, Basic definitions: waveforms, cycle, time period, frequency, amplitude, Determination of average, RMS value, form factor & peak factor for different alternating waveforms, Phase and phase difference.

UNIT IV: SINGLE PHASE AC CIRCUITS

UNIT V: TRANSIENT ANALYSIS

UNIT VI: MAGNETICALLY COUPLED CIRCUITS
Coupled circuits, self & mutual inductance, DOT conventions, coefficient of coupling, Analysis of magnetic circuits: Series, Parallel and Composite, comparison of electrical and magnetic circuits.
UNIT VII: NETWORK THEOREMS-I
Thevenin’s, Norton’s, Maximum Power Transfer and Superposition theorems for D.C. and sinusoidal excitations, Its applications.

UNIT VIII: NETWORK THEOREMS-II
Tellegen’s, Millman’s, Reciprocity, substitution and compensation theorems for D.C. and sinusoidal excitation, Its applications.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech, I Semester

10BT40404: SWITCHING THEORY AND LOGIC DESIGN
(Common to EEE, EIE & E.Con.E)

UNIT I: NUMBER SYSTEMS & CODES
Philosophy of number systems - complement representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

UNIT II: BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS
Fundamental postulates of Boolean Algebra, Basic theorems and properties, switching functions, Canonical and Standard forms, algebraic simplification, digital logic gates, properties of XOR gate, universal gates, Multilevel NAND/NOR realizations.

UNIT III: MINIMIZATION OF SWITCHING FUNCTIONS
Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicant chart, simplification rules.

UNIT IV: COMBINATIONAL LOGIC DESIGN

UNIT V: PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC
Basic PLD's-ROM, PROM, PLA, PAL, Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, synthesis of threshold functions, multigate synthesis.

UNIT VI: SEQUENTIAL CIRCUITS - I
Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic flip-flops, Triggering and excitation tables, Steps in synchronous sequential circuit design, Design of Synchronous counters - modulo-N, up/down counter, ring counter, Johnson counter, Design of Asynchronous counter-modulo-N, Sequence detector, Serial binary adder.
UNIT VII: SEQUENTIAL CIRCUITS - II
Finite state machine-capabilities and limitations, Mealy and Moore models, minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods, concept of minimal cover table.

UNIT VIII: ALGORITHMIC STATE MACHINES
Salient features of the ASM chart, Simple examples, System design using data path and control subsystems, control implementations, examples of Weighing machine and Binary multiplier.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech, I Semester

10BT41001: ELECTRICAL AND ELECTRONIC MEASUREMENTS

L T P C
4 1 - 4

UNIT-I: AMMETERS AND VOLTMETERS

UNIT-II: OHMMETERS AND POTENTIOMETERS
Series ohmmeter, shunt ohmmeter, multimeters. DC Potentiometers: Basic potentiometer circuit, standardization, Compton's Potentiometers, applications. AC Potentiometers: Standardization, Polar types and Coordinate types, applications.

UNIT-III: POWER, POWER FACTOR & ENERGY METERS
Construction, working principle and expression of torque equation for single phase electrodynamowattmeter, single phase electrodynamo power factor meter and single phase induction energy meter. Testing of energy meter by direct loading, Phantom loading methods.

UNIT-IV: BRIDGES

UNIT-V: ELECTRONIC INSTRUMENTS
AC voltmeter using rectifiers, true RMS reading Voltmeter, electronic multimeter, digital voltmeters: ramp DVM, staircase ramp DVM, dual slope DVM and successive approximation DVM.

UNIT-VI: FREQUENCY AND TIME MEASUREMENTS
UNIT-VII: OSCILLOSCOPES
Motion of electron in electric and magnetic fields, electrostatic and magnetic focusing, deflection sensitivity in both cases, CRO operation, CRT characteristics, CRO probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operations, A, B, alternate & chop modes. Sampling oscilloscopes, storage oscilloscope. Standard specifications of CRO, synchronous selector circuits, Lissajous figures.

UNIT-VIII: ANALYZERS AND RECORDERS
Spectrum analyzers, different types of spectrum analyzer, recorders, introduction to magnetic recording techniques & X-Y plotters. Display devices and display systems, logic analyzers.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I: SIGNAL ANALYSIS
Signal definition, classification of signals, basic operations on signals,
Analogy between vectors and signals, Orthogonal signal space,
Signal approximation using orthogonal functions, Mean square error,
Closed or complete set of orthogonal functions, Orthogonality in
complex functions, Exponential and sinusoidal signals, Concepts of
Impulse function, Unit step function, Signum function.

UNIT II: FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS
Representation of Fourier series, Continuous time periodic signals,
properties of Fourier series, Dirichlet's conditions, Trigonometric
Fourier series and Exponential Fourier series, Complex Fourier
spectrum.

UNIT III: FOURIER TRANSFORMS
Deriving Fourier transform from Fourier series, Fourier transform of
arbitrary signal, Fourier transform of standard signals, Fourier
transform of periodic signals, properties of Fourier transforms,
Fourier transforms involving impulse function and Signum function.
Introduction to Hilbert Transform.

UNIT IV: SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS
System definition, classification of systems, Linear system, impulse
response, Response of a linear system, Linear time invariant (LTI)
system, Linear time variant (LTV) system, Transfer function of a LTI
system. Filter characteristics of linear systems. Distortion less
transmission through a system, Signal bandwidth, system
bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and
Poly-Wiener criterion for physical realization, relationship between
bandwidth and rise time.
UNIT V: CONVOLUTION AND CORRELATION OF SIGNALS
Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval’s theorem, power density spectrum, relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation, detection of periodic signal in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT VI: LAPLACE TRANSFORMS
Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T’s relation between L.T’s, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT VII: SAMPLING
Sampling theorem - Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling - Aliasing, Introduction to Band Pass sampling.

UNIT VIII: Z-TRANSFORMS

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech, I Semester

10BT30411 : SEMICONDUCTOR DEVICES AND CIRCUITS LAB
(Common to ECE, EIE & EConE)

L T P C
- - 3 2

PART A: (Only for viva voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs.

2. Identification, Specifications and Testing of Active Devices, Diodes: BJTs, Low-power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.

3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (Minimum of 10 experiments to be conducted)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration.
5. Halfwave Rectifier with and without filters.
6. Fullwave Rectifier with and without filters.
7. FET characteristics
12. SCR Characteristics.
13. UJT Characteristics.
List of Experiments:

1. Basic Operations on Matrices
2. Generation of Various signals and Sequences (Periodic and Aperiodic), Such as Unit Impulse, Unit Step, Square, Saw Tooth, Triangular, Sinusoidal, Ramp, Sinc function.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting, Folding, Computation of Energy and Average Power.
4. Finding the Even and Odd Parts of Signal or Sequence and Real and Imaginary Parts of Signal.
5. Convolution between Signals and Sequences.
6. Autocorrelation and Cross correlation between Signals and Sequences.
12. Locating Zeros and Poles, and plotting the Pole-Zero maps in S-Plane and Z-Plane for the given Transfer Functions.
17. Verification of Weiner-Khinchine Relations.
II B.Tech, II Semester

10BT40401 : ELECTRONIC CIRCUITS ANALYSIS
(Common to ECE, EIE & EConE)

UNIT-I: SINGLE STAGE AMPLIFIERS

UNIT-II: MULTI STAGE AMPLIFIERS
Analysis of Cascaded RC Coupled BJT Amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers – RC Coupled Amplifier, Direct and Transformer Coupled Amplifiers.

UNIT-III: BJT FREQUENCY RESPONSE

UNIT-IV: MOSFET AMPLIFIERS
Basic Concepts, MOSFET Small Signal Model, Common Source Amplifier with Resistive Load, Diode Connected Load and Current Source Load, Source Follower, Common gate stage cascode and folded cascode amplifier and their Frequency Response.

UNIT-V: FEEDBACK AMPLIFIERS
UNIT-VI : OSCILLATORS
Conditions for oscillations, RC and LC Type Oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized Analysis of LC Oscillators, Quartz, Hartley and Colpitts Oscillators, RC-Phase Shift and Wien-Bridge Oscillators.

UNIT-VII : LARGE SIGNAL AMPLIFIERS

UNIT-VIII : TUNED AMPLIFIERS

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech, II Semester
10BT40402 : PULSE AND DIGITAL CIRCUITS
(Common to ECE, EIE & EConE)

UNIT-I: LINEAR WAVE SHAPING
High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. High pass RC network as differentiator and Low pass RC network as integrator, attenuators and its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit. Problem solving.

UNIT-II: NON-LINEAR WAVE SHAPING
Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and diode resistances into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Synchronized clamping.

UNIT-III: SWITCHING CHARACTERISTICS OF DEVICES
Diode as a switch, piecewise linear diode characteristics, Diode switching times, Transistor as a switch, Break down voltages, transistor in saturation, temperature variations of saturation parameters, Transistor-switching times, Silicon-controlled-switch circuits.

UNIT-IV: MULTIVIBRATOR CIRCUITS
Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger Circuit using BJT, Concept of triggering, Symmetrical and asymmetrical configurations.

UNIT-V: TIME BASE GENERATORS
General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators - basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Transistor Current time base generators, Methods of linearity improvements.
UNIT VI: SAMPLING GATES
Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode Sampling gate, Reduction of pedestal in gate circuits, Six diode gate, Applications of sampling gates.

UNIT-VII: SYNCHRONIZATION AND FREQUENCY DIVISION
Principles of Synchronization of relaxation Devices, Frequency division in sweep circuit, Stability of relaxation devices, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit, A Sinusoidal Divider using Regeneration and Modulation.

UNIT-VIII: REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS
AND, OR & NOT gates using Diodes & Transistors, DCTL, RTL, DTL, TTL and CMOS Logic families, and Comparison between the logic families.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT-I: INTRODUCTION TO MEASUREMENT AND TRANSDUCERS

UNIT-II: PERFORMANCE CHARACTERISTICS
Static characteristics: Calibration, accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, reproducibility, repeatability, dead space, span, range.
Dynamic characteristics: Generalized mathematical model of measurement system. Zero order, first order and second order measurement systems and their response to Step, Ramp and Impulse inputs. Frequency response of first order and second order systems.

UNIT-III: RESISTIVE TRANSDUCERS
Potentiometers, strain gauges and their types, resistance temperature detector, thermistor, light dependent resistors.

UNIT-IV: INDUCTIVE TRANSDUCERS
Variable reluctance, eddy current, linear variable differential transformers, electromagnetic, synchros, resolvers & inductosyn, magnetoelastic and magnetostrictive.

UNIT-V: CAPACITIVE TRANSDUCERS
Variable and differential dielectric, variable and differential gap between the plates, variable and differential area, frequency response, measurement of humidity, liquid level, displacement and pressure.

UNIT-VI: SELF GENERATING TRANSDUCERS
Thermoelectric transducers, Piezoelectric transducers, Pyroelectric transducers, Photovoltaic transducers, force-balance transducers.
UNIT-VII: SIGNAL CONDITIONING
Block diagram of signal conditioning, balance and deflection measurement in Wheatstone bridge, measurement of reactance: Push-pull bridge and Blumein bridge. Carrier amplifier, chopper amplifier, low drift amplifier and charge amplifier

UNIT-VIII: DIGITAL AND OTHER TRANSDUCERS
Position encoders, Transducer based on semiconductor junctions: Thermometers, magnetodiodes & magnetotransistors, photodiodes & phototransistors. Fiber-optic transducers, ultrasonic transducers. MEMS and Nanosensors.

TEXT BOOKS:

REFERENCE BOOKS:
10BT40501: COMPUTER ARCHITECTURE AND ORGANIZATION

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UNIT I: STRUCTURE OF COMPUTERS
Computer Types, Functional Units, Basic Operational concepts, Von-Neumann Architecture, Bus Structures, Software, Performance, Multiprocessors and Multicomputers.


UNIT II: REGISTER TRANSFER AND MICRO-OPERATORS

Central Processing Unit: Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC). Comparison of RISC and CISC.

UNIT III: MICROPROYMED CONTROL
Control Memory, Address Sequencing, Micro-program Example, Design of Control Unit, Hardwired Control, Micro-programmed Control, Nanoprogramming.

UNIT IV: PIPELINE AND VECTOR PROCESSING
Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data Path & Control Consideration, Superscalar Operations, Vector Processing, Array Processors.

UNIT V: THE MEMORY SYSTEM
Basic Concepts, Semiconductor RAM, Types of Read-only memory (ROM), Cache Memory, Performance Considerations, Virtual Memory, Secondary Storage, and Introduction to Redundant Array of Inexpensive Disks (RAID).

UNIT VI : INPUT-OUTPUT ORGANIZATION (ADVANCED)
Input-Output Processor (IOP), Serial communication, Introduction to peripheral component Interconnect (PCI) bus, Introduction to Standard Serial Communication Protocols like RS232, USB, and IEEE1394.

UNIT VII : MULTIPROCESSORS

UNIT VIII : CASE STUDIES
CISC Architecture-Pentium IV, RISC Architecture-PowerPC

TEXT BOOKS:

REFERENCES:
II B.Tech, II Semester

10BT40221: PRINCIPLES OF ELECTRICAL ENGINEERING
(Common to ECE, EIE & E.Con.E)

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UNIT-I: TWO PORT NETWORKS
Impedance parameters, admittance parameters, hybrid parameters, transmission (ABCD) parameters, conversion of one parameter to another, conditions for reciprocity and symmetry, interconnection of two port networks in series, parallel and cascaded configurations, image parameters, illustrative problems.

UNIT-II: FILTERS
Classification of filters, filter networks, classification of pass band and stop band, characteristic impedance in the pass band & stop bands, constant-k Low pass filter, high pass filter, m-derived T-section, band pass filter and band elimination filter, illustrative problems.

UNIT-III: SYMMETRICAL ATTENUATORS
Symmetrical attenuators, T-type attenuator, ||-type attenuator, bridged T type attenuator, lattice attenuator.

UNIT-IV: DC MACHINES
Principle of operation of DC Machines- constructional features, EMF equation, Types of DC machines, Magnetization and load characteristics of DC generators, characteristics of DC motors, losses and efficiency, Swinburne's test, Speed control: flux and armature voltage control of DC shunt motor.

UNIT-V: POLY PHASE SYSTEM
Advantages of poly phase system over single phase system - phase sequence - star & delta connections, relationship between phase and line quantities, balanced and unbalanced circuits, power measurement in three phase systems using two wattmeter method - problems.

UNIT-VI: TRANSFORMERS AND THEIR PERFORMANCE
Principle of operation of single phase transformer, types , constructional features, phasor diagram on No load and load, equivalent circuit, losses and efficiency of transformer and regulation, OC and SC tests, predetermination of efficiency and regulation (simple problems).
UNIT-VII : THREE PHASE INDUCTION MOTORS AND ALTERNATORS

Principle of operation of three phase induction motors, slip ring and squirrel cage motors, alternators: constructional features, principle of operation, types, EMF equation (simple problems).

UNIT-VIII : SPECIAL MACHINES

Principle of operation - shaded pole motors, capacitor motors, AC servomotor, AC tachometers, synchros, stepper motor - characteristics.

TEXT BOOKS:

REFERENCE BOOKS:
II B.Tech, II Semester

10BT41301: CONTROL SYSTEMS
(Common to ECE, EIE & E.Con.E) L T P C 4 1 - 4

UNIT I : INTRODUCTION
Concepts of Control Systems, Open Loop and closed loop control systems, Feed-Back Characteristics, Effects of feedback, Block diagram representation of physical systems, Mathematical models-differential Equations.

UNIT II : TRANSFER FUNCTION REPRESENTATION
Analogous systems, electrical analogy of physical systems, Derivation of transfer function, Transfer function of DC Servo motor, Synchro transmitter and receiver, Block diagram algebra, Signal Flow graph and Mason’s gain formula.

UNIT III : TIME RESPONSE ANALYSIS
Types of test signals, Response of first and second order system, Time domain specifications, type and order of systems, steady state error, static error constants, generalized error co-efficients. Effect of P, PI, PID on time response.

UNIT IV : STABILITY ANALYSIS IN S-DOMAIN
Root Locus Technique: Root locus concept, construction of root loci, effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT V : FREQUENCY RESPONSE ANALYSIS
Introduction, Frequency domain specifications, Bode diagrams, Determination of Frequency domain specifications and transfer function from the Bode Diagram, Phase margin and Gain margin, Stability Analysis from Bode Plots.

UNIT VI : STABILITY ANALYSIS IN FREQUENCY DOMAIN
Polar Plots, Nyquist plots, stability in frequency domain using Nyquist stability criterion, simple problems.

UNIT VII : Design and Compensation of Control Systems
Introduction to Compensation networks, Lag, Lead, lead-lag compensation, Compensation using Bode plots.
UNIT VIII : STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS
Concepts of state, state variables and state model, derivation of state model for physical systems Diagonalization, State Transition Matrix and its Properties, Solution of linear state equation, Concepts of Controllability and Observability, Kalman's test only.

TEXT BOOKS:

REFERENCES:
Minimum of **12** Experiments to be conducted

1. Measurement of AC parameters (Voltage & Current) using D’Arsonval Galvanometers
2. Conversion of D’Arsonval Galvanometer into ohmmeter (Series & Shunt)
3. Measurement of unknown resistance, inductance and capacitance using bridge circuits
4. Study of Spectrum Analyzer
5. Measurement of resistance, inductance, capacitance and quality factor of the coil using Q meter
6. Calibration and testing of single phase energy meter
7. Linear displacement measurement using LVDT
8. Temperature measurement using RTD
9. Strain measurement using Strain Gauges
10. Angular displacement using Capacitive transducer
11. Transfer characteristics of thermocouple
12. Level measurement using Fibre-optic sensor
13. Pressure measurement using Bourdon tube
14. Study of Piezo – electric Transducer
II B.Tech, II Semester

10BT40231: ELECTRICAL ENGINEERING LAB
(Common to ECE, EIE & E.Con.E)

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Any 6 experiments from each part to be conducted

PART - A
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters, Z-Y parameters, analytical verification.
4. Two port network parameters – ABCD and h-parameters.
5. Verification of Superposition and Reciprocity theorems.
6. Verification of maximum power transfer theorem. Verification on both DC and AC.
7. Experimental determination of Thevenin’s and Norton’s equivalent circuits and verification by direct test.
8. Constant - k low pass filter and high pass filter – design and test.

PART - B
1. Magnetization characteristics of DC shunt generator. Determination of critical filed resistance.
2. Swinburne’s test on DC shunt machine (Predetermination of efficiency of a given DC shunt machine working as motor and generator)
4. Speed control of DC motor by
   a. Field flux control method
   b. Armature voltage control method.
5. OC & SC tests on single-phase transformer (predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
6. Load test on single phase transformer.
II B.Tech, II Semester

10BT4HS02: ADVANCED ENGLISH COMMUNICATION SKILLS
(Audit Course)
(Common to ECE, EEE, EI E, EConE & BOT)

UNIT I: VOCABULARY BUILDING
Synonyms and Antonyms, Word roots, One-word substitutes, Prefixes and Suffixes, Study of word origin, Analogy, Idioms and Phrases.

Functional English: starting conversation, responding appropriately and relevantly, using the right body language, role play in different situations.

UNIT II: READING COMPREHENSION
Reading for facts, Guessing meanings from context, Scanning, Skimming, Inferring meaning and Critical reading.

UNIT III: ACADEMIC ESSAY WRITING
Accuracy, Brevity, Clarity, Brainstorm, List your ideas, Sub-headings, Revising Content and Organization.

UNIT IV: TECHNICAL REPORT WRITING
Types of formats and styles, Subject-matter, Subject-organization, Clarity, Coherence and Style, Planning, Data-collection, Tools, Analysis.

UNIT V: CAREER SKILLS
Career direction, Exploring your talents, Personality inventories, Write a “Who I Am” statement, Thinking further, Perform career research, How do I get hired, Creating job satisfaction, Identify your satisfaction triggers, Positive attitude, Maintain a balanced lifestyle, Analyze your job in terms of your interests, Set goals to bring your interests and responsibilities in line, Personal SWOT analysis, Making the most of your talents and opportunities, Shaping your job to fit you better, Future proof your career, Managing your emotions at work, Get the recognition you deserve.

UNIT VI: RESUME WRITING
Structure and Presentation, Planning, Defining the career objective, Projecting ones strengths and skill-sets, Summary, Formats and Styles, Cover letter.
UNIT VII : GROUP DISCUSSION
Dynamics of group discussion, Intervention, Summarizing, and Modulation of voice, Fluency and Coherence, Participation, Relevance, Assertiveness, Eye contact and Body language.

UNIT VIII : INTERVIEW SKILLS
Concept and Process, Pre-interview planning, Opening strategies, Answering strategies, Interview through Tele and Video-conferencing.

REFERENCES:

SUGGESTED SOFTWARE:
- TOEFL, GRE and IELTS (Kaplan, Aarco and Barrons, Cliffs)
- Softwares from ‘train2success.com’
- Resume Preparation, K-Van Solutions.
- Facing Interviews, K-Van Solutions.
- Study Skills Success, (Essay, Vocabulary strategies, IELTS), Young India Films.
- Vocabulary Builder, Young India Films.
- E-correspondence, Young India Films.
- Group Discussions, (Ease – 2), Young India Films.
- Report Writer, Young India Films.
UNIT I : INTRODUCTION

UNIT II : AMPLITUDE MODULATION
Need for Modulation, Types of Amplitude Modulation, AM, DSBSC, SSBSC, Power and BW requirements, generation of AM, DSBSC, SSBSC, demodulation of AM: Diode detector, Product demodulation for DSBSC & SSBSC.

UNIT III : ANGLE MODULATION
Frequency & Phase Modulations, advantages of FM over AM, Bandwidth consideration, Narrowband and Wideband FM, generation and demodulation of FM, Comparison of FM & PM.

UNIT IV : PULSE MODULATIONS
Sampling, Nyquist rate of Sampling, Sampling theorem for Band limited Signals, PAM, regeneration of Base band Signal, PWM and PPM, Time Division Multiplexing, Frequency Division Multiplexing, Asynchronous Multiplexing.

UNIT V : PCM SCHEMES
Advantages, Block diagram of PCM, Quantization, effect of Quantization, Quantization error, Base band Digital Signal, DM, ADM, ADPCM and Comparison.

UNIT VI : DIGITAL MODULATION
ASK, FSK, PSK, QPSK, DPSK, QAM, Modulation and Demodulation- Coherent and Incoherent, Modems.
UNIT VII : INFORMATION THEORY
Concept of Information, Rate of Information and Entropy, Source Coding for optimum rate of Information, Coding efficiency, Shanon-Fano and Huffman Coding.

UNIT VIII : ERROR CONTROL CODING
Introduction, Error Detection and Correction Codes, Block Codes, Convolutional Codes.

TEXT BOOKS:

REFERENCE BOOKS:
III B.Tech, I Semester
10BT50422 : LINEAR AND DIGITAL IC APPLICATIONS
(Common to EIE & EConE)

UNIT I
Differential Amplifier-Characteristics of OP-Amps, Integrated circuits-
Types, Classification, Package Types and temperature ranges,
Power supplies, Op-amp Block Diagram, ideal and practical Op-amp
specifications, DC and AC characteristics, 741 op-amp & its features,
Output Off set voltages & currents, slew rates, CMRR, PSRR, drift,
Frequency Compensation technique.

UNIT II : LINEAR & NON-LINEAR APPLICATIONS OF OP-AMPS
Inverting and Non-inverting amplifier, Integrator and differentiator,
Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I
to V converters, Buffers. Non-Linear function generation,
Comparators, Multivibrators, Triangular and Square wave
generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT III: TIMERS & PHASE LOCKED LOOPS
Introduction to 555 timer, functional diagram, Monostable and
Astable operations and applications, Schmitt Trigger. PLL -
introduction, block schematic, principles and description of individual
blocks, 565 PLL, Applications of PLL - frequency multiplication,
frequency translation, AM, FM & FSK.

UNIT IV : CMOS LOGIC
Introduction to logic families, CMOS logic, CMOS steady state
electrical behavior, CMOS dynamic electrical behavior, CMOS logic
families.

UNIT V : BIPOLAR LOGIC AND INTERFACING
Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing,
low voltage CMOS logic and interfacing, Emitter coupled logic,
Comparison of logic families, Familiarity with standard 74XX and
CMOS 40XX series-ICs - Specifications.
UNIT VI : THE VHDL HARDWARE DESCRIPTION LANGUAGE
Design flow, program structure, types and constants, functions and procedures, libraries and packages. Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT VII : COMBINATIONAL LOGIC DESIGN
Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT VIII : SEQUENTIAL LOGIC DESIGN
Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

TEXT BOOKS:

REFERENCE BOOKS:
UNIT-I: INTRODUCTION TO ENVIRONMENTAL SCIENCES
Definition and concept of the term environment - Various components of environment - Abiotic and biotic - Atmosphere - Hydrosphere - Lithosphere - Biosphere - Inter relationships - Need for public awareness - Role of important national and international individuals and organizations in promoting environmentalism.

UNIT-II: NATURAL RESOURCES, CONSERVATION AND MANAGEMENT
Renewable and Non renewable resources and associated problems - Forests: Deforestation, Causes, effects and remedies - Effects of mining, dams and river valley projects - case studies; Water resources: Water use and over exploitation - Conflicts over water - Large dams - benefits and problems; Food resources : World food problems - Adverse effects of modern agriculture - Fertilizer and pesticide problems; Land resources: Land degradation - Land slides- Soil erosion - desertification - water logging - salinity - Causes, effects and remedies; Mineral resources: Mining - Adverse effects; Energy resources: Growing needs - Renewable and Non renewable resources - Alternate resources: Coal, Wind, Oil, Tidal wave, Natural gas, Biomass and Biogas, Nuclear energy, Hydrogen fuel and Solar energy - Impact on environment - Sustainable life styles.

UNIT-III: ECOLOGY AND ECOSYSTEM

UNIT-IV: BIO DIVERSITY, CONSERVATION AND MANAGEMENT
Introduction - Definition and concept of biodiversity - Value of biodiversity - Role of biodiversity in addressing new millennium challenges - Global, national biodiversity - Hot spots of biodiversity - Threats to biodiversity - Man and wild life conflicts - Remedial measures - Endemic, endangered and extinct species - In-situ and ex-situ conservation of biodiversity.
UNIT-V: ENVIRONMENT POLLUTION AND CONTROL
Definition, causes, adverse effects and control measures of air pollution, indoor pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear pollution - Solid waste management - Causes, effects, control and disposal methods - Role of individuals in the prevention of pollution - Hazards and disaster management - Floods - Earthquakes - Tsunamis - Cyclones - Land slides - Case studies.

UNIT-VI: SOCIAL ISSUES AND THE ENVIRONMENT

UNIT-VII: HUMAN POPULATION AND ENVIRONMENT

UNIT-VIII: Field Work/Environmentalist’s Diary/Assignments/Seminars

TEXT BOOKS:

REFERENCE BOOKS:
III B.Tech, I Semester

10BT50421 : ELECTRO MAGNETIC THEORY
(Common to EI E & EConE)

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Review of Coordinate Systems, Vector Calculus.

UNIT I : ELECTROSTATIC FIELDS

UNIT II: ELECTRIC FIELDS IN MATERIAL SPACE
Properties of Materials, Convection and Conduction Currents, Conductors, Relaxation Time, Dielectrics and polarization, boundary conditions, Poisson's and Laplace's Equations; Capacitance: Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT III : MAGNETO STATICS

UNIT IV: MAXWELL'S EQUATIONS (TIME VARYING FIELDS)

UNIT V: EM WAVE CHARACTERISTICS - I
UNIT VI: EM WAVE CHARACTERISTICS - II

UNIT VII : INTRODUCTION TO EMI
Definition of EMI and EMC, Classification, Natural and man-made EMI sources, Switching transients, Electrostatic Discharge, Nuclear Electromagnetic, Pulse and High Power Electromagnetics.

UNIT VIII : INTRODUCTION TO EMC

TEXT BOOKS:

REFERENCE BOOKS:
UNIT I : STATE SPACE ANALYSIS
state Space Representation using phase variables, Solution of State
Equation, State Transition Matrix, Diagonalization, Canonical Forms,
Controllable Canonical Form, Observable Canonical Form, Jordan
Canonical Form.

UNIT II : CONTROLLABILITY AND OBSERVABILITY
Tests for controllability and observability for continuous time systems,
Necessary and sufficient conditions for controllability and
observability, Principle of Duality, Controllability and observability
form Jordan canonical form and other canonical forms.

UNIT III : DESCRIBING FUNCTION ANALYSIS
Introduction to nonlinear systems, Different physical nonlinearities,
describing functions, describing function analysis of nonlinear control
systems.

UNIT IV : PHASE-PLANE ANALYSIS
Introduction to phase-plane analysis, Method of Isoclines for
Constructing Trajectories, singular points, phase-plane analysis of
nonlinear control systems, Delta method.

UNIT V : STABILITY ANALYSIS
Stability in the sense of Lyapunov, Lyapunov's stability and Lyapunov's
instability theorems, Graphical representation, Sylvester principle,
Definiteness, Direct method of Lyapunov for the Linear and Nonlinear
continuous time autonomous systems.

UNIT VI : MODAL CONTROL
Effect of state feedback on controllability and observability, Design
of State Feedback Control through Pole placement. Full order
observer and reduced order observer.
UNIT VII: OPTIMAL CONTROL

UNIT VIII: CALCULUS OF VARIATIONS
Minimization of functionals of single function, Euler Lagrange Equation, Constrained minimization, Minimum principle, Control variable inequality constraints, Control and state variable inequality constraints.

TEXT BOOKS:

REFERENCES:
III B.Tech, I Semester

10BT51302 : PROCESS CONTROL

UNIT I: INTRODUCTION TO PROCESS CONTROL
Definition-Elements of process control-Process variables-degrees of freedom- Characteristics of liquid system, gas system and thermal system- Mathematical model of liquid process, gas process, thermal process- Batch process and continuous process- Self regulation.

UNIT II: BASIC CONTROL ACTIONS AND CONTROLLER TUNING
Characteristics of ON-OFF, proportional, integral, derivative control modes, composite control modes: PI, PD and PID modes, Ziegler Nichols method and Cohen-Coon method

UNIT III: FEEDBACK MEASURING ELEMENTS
Temperature elements Thermocouple, Bolometer and Radiational pyrometer, liquid level measurements Floating object method, resistance method, Gamma ray method, fluid flow measurements Orifice plates, venture tube and hotwire anemometer, pneumatic transmission, electrical transmission, first order and second order response to measuring elements (Thermometer and Manometer).

UNIT IV: CONTROLLING ELEMENTS
Pneumatic controllers (displacement and force type), Air supply for pneumatic systems, Hydraulic controllers, Electronic controllers.

UNIT V: ADVANCED CONTROL TECHNIQUES AND FINAL CONTROL ELEMENTS
Feedback Control, Feedforward control, Ratio control, cascade control, split range control, Final Control Elements Pneumatic actuators, Electropneumatic actuators, Hydraulic actuators –Electric motor actuators, Sliding stem control valves, Rotating shaft control valves, control valve sizing.

UNIT VI: HEAT ENERGY TRANSFER
Heat transfer, heat exchangers without phase change, Boiling liquids and condensing vapors, combustion control of fuel and air, fired heaters, steam plant control systems.
UNIT VII: CHEMICAL REACTIONS AND CONVERSIONS
Principles governing the conduct of reactions-chemical equilibrium-
reaction rate- Stability of exothermic reactors - continuous reactors-
apporting reactant flows, temperature control-maximizing
procedure- controlling conversion.

UNIT VIII: MASS TRANSFER OPERATIONS
A brief study of instrumentation and control relevant to some of the
following industries:
Cement, petrochemicals, steel, Nuclear power plant & Operations.

TEXT BOOKS:

REFERENCES:
1. Liptak & Venezel, Instrument Engineering Hand Book, Chilton
    Randor.
2. B.Wayne Bequette, Wayne B Bequette, Process control: Modelling
    Design and simulation.
3. D.R Coughanowr, Process system analysis and control, 
4. Stephanopoulous, Chemical process control.
III B.Tech, I Semester

10BT50431: IC AND PDC LAB
(Common to EIE & EConE)

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List of Experiments:

PART - A:
1. Linear wave shaping.
2. Non Linear wave shaping - Clippers & Clampers.
3. Transistor as a switch.
4. Sampling Gates.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Schmitt Trigger.
8. UJT Relaxation Oscillator.

PART - B: (Design Aspects to be Included)
1. Bistable Multivibrator.
3. Astable Multivibrator.
List of Experiments:
(Minimum of Twelve experiments to be conducted)

I) Design and Simulation in Simulation Laboratory using Any Simulation Software. (Minimum of Six Experiments to be conducted):

1. Common Emitter amplifier
2. Common Source amplifier
3. A Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Series Feedback Amplifier
5. Cascade Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
8. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier

II) Testing in the Hardware Laboratory:
Any Three circuits simulations in Simulation laboratory
Any Three of the following
   Class A Power Amplifier (with transformer load)
   Class C Power Amplifier
   Single Tuned Voltage Amplifier
   Hartley and Colpitt’s Oscillators
   Darlington Pair
   MOSFET Amplifier
III B.Tech, II Semester

10BT4HS01: MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTANCY
(Common to EEE, EIE & EConE)

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UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS

UNIT II: THEORY OF PRODUCTION AND COST ANALYSIS
Production function: Isoquants and isocosts, Input – output relationship, law of returns, internal and external economies of scale, cost concepts: opportunity Vs out lay costs, Fixed Vs Variable costs, Explicit Vs implicit costs, out of pocket Vs inputted costs. Break Even Analysis (BEA), Determination of break even point, (Simple problems).

UNIT III: INTRODUCTION TO MARKETS AND PRICING

UNIT IV: BUSINESS AND NEW ECONOMIC ENVIRONMENT
UNIT V: INTRODUCTION AND PRINCIPLES OF ACCOUNTING:

UNIT VI : FINAL ACCOUNTS
Introduction to final accounts, Trading Account, Profit and Loss Account, and Balance Sheet with Simple Adjustments, (Simple Problems).

UNIT VII: CAPITAL AND CAPITAL BUDGETING
Capital: significance, Types of capital, Capital Budgeting: Nature and scope of capital budgeting, Features and Methods of capital budgeting, Pay Back Period Method, Accounting Rate of Return Method, Internal Rate of Return Method, Net present Value Method, and Profitability Index. (Simple Problems).

UNIT – VIII: COMPUTERIZATION OF ACCOUNTANCY SYSTEM

TEXT BOOKS:

REFERENCES:
III B.Tech, II Semester

10BT60401: DIGITAL SIGNAL PROCESSING
(Common to EEE, ECE, EI E & EConE)

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UNIT-I : INTRODUCTION TO DIGITAL SIGNAL PROCESSING
Discrete-time signals and sequences, Linear shift invariant systems,
Stability and Causality, Linear constant coefficient difference
equations. Frequency domain representation of discrete-time
signals and systems.

UNIT-II: DISCRETE FOURIER SERIES
DFS representation of periodic sequences, properties of Discrete
Fourier Series. Discrete Fourier Transforms: properties of DFT, Linear
convolution of sequences using DFT, Computation of DFT. Relation
between Z-Transform and DFS.

UNIT-III : FAST FOURIER TRANSFORMS
Fast Fourier transforms (FFT): Radix-2 Decimation in time(DIT) and
Decimation in frequency (DIF) FFT algorithms, Inverse FFT and FFT
for composite N.

UNIT-IV : REALIZATION OF DIGITAL FILTERS
Review of Z-transforms, Applications of Z-Transforms, Solution for
difference equations of digital filters, Block diagram representation
of linear constant-coefficient difference equations. Basic structures
of IIR systems, Transposed forms. Basic structures of FIR systems,
System function.

UNIT-V : IIR DIGITAL FILTERS
Introduction to analog and digital filters, Analog filter
approximations-Butterworth and chebyshev, Design of IIR digital
filters from analog filters, Design examples: analog-digital
transformations.
UNIT-VI

FIR DIGITAL FILTERS
Characteristics of FIR digital filters, Frequency response. Design of
FIR digital filters using windowing techniques, Frequency sampling
technique, Comparison of IIR and FIR filters.

UNIT-VII

MULTIRATE DIGITAL SIGNAL PROCESSING FUNDAMENTALS
Basic sample rate alteration devices, Decimation, Interpolation,
Sampling rate conversion, Implementation of sampling rate
conversion, Multistage design of decimator and Interpolator.

UNIT-VIII

APPLICATIONS OF DIGITAL SIGNAL PROCESSING
Spectral analysis of nonstationary Signals, Musical sound processing,
Signal Compression, Transmultiplexers, Discrete multitone
transmission of digital data.

TEXT BOOKS:
1. John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing,
2. A. V. Oppenheim and R. W. Schaffer, Discrete Time Signal Processing,

REFERENCE BOOKS:
1. S Salivahana, A Vallavaraj, C Gnanapriya, Digital Signal
2. Andreas Antoniou, Digital Signal Processing, TATA McGraw Hill,
   2006.
III B.Tech, II Semester

10BT60404: MICROPROCESSORS AND MICROCONTROLLERS
(Common to ECE, EEE, EIE & EConE)

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UNIT I: 8085 ARCHITECTURE
Microprocessor evolution and types, introduction to 8085 architecture, register organization, pin description, Instruction set (briefly), simple programs, Interrupts of 8085, Interfacing I/O devices using Memory mapped I/O & I/O mapped I/O

UNIT II: 8086 ARCHITECTURE
Architecture of 8086 microprocessor, register organization, special functions of General Purpose Registers, memory segmentation, pin description, minimum & maximum mode operation of 8086, timing diagram.

UNIT III: 8086 INSTRUCTION SET AND ASSEMBLER DIRECTIVES
Machine language instruction formats, addressing modes, instruction set of 8086 in detail, assembler directives, simple programs, procedures and macros.

UNIT IV: PROGRAMMABLE INTERFACING DEVICES
Types of Data communication, Serial & Parallel. Methods of parallel data transfer, 8255A (Programmable peripheral interface) internal block diagram, operational modes and initialization, interface of I/O devices - A/D, D/A, Key Board, Stepper Motor.

UNIT V: SERIAL DATA COMMUNICATION
Types of Serial Data Transmission, Synchronous and Asynchronous, 8251 (USART), Simple programs for sending and receiving characters with an 8251 (polling & interrupt basis). Serial communication standard - RS232C, RS232C to TTL and TTL to RS232C conversion, USB.

UNIT VI: INTERFACING WITH ADVANCED DEVICES
Memory (static RAM and EPROM) and I/O interfacing with 8086, 8257 (DMA Controller), Interrupt structure, Interrupt Vector table, 8259 Programmable Interrupt Controller (PIC), importance of cascading of PICs.
UNIT VII : 8051 MICROCONTROLLER
Architecture of 8051 microcontroller, Internal and External memories, Addressing modes and Instruction set of 8051, Simple Programs using 8051.

UNIT VIII : 8051 INTERRUPTS, COMMUNICATION AND APPLICATIONS
Interrupts, Timers/Counters and Serial Communication, Programming of Interrupts, Timers/Counters and Serial Communication interrupts. Interfacing LEDs, Seven segment display.

TEXT BOOKS

REFERENCE BOOKS:
III B.Tech, II Semester

10BT4EC01: OPTIMIZATION TECHNIQUES

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UNIT I: INTRODUCTION TO OPTIMIZATION TECHNIQUES
Statement of an Optimization problem, design vector, design constraints, constraint surface, objective function, objective function surfaces, classification of Optimization problems.

UNIT II: CLASSICAL OPTIMIZATION TECHNIQUES
Single variable Optimization, multi variable Optimization without constraints, necessary and sufficient conditions for minimum/maximum, multivariable Optimization with equality constraints, Solution by method of Lagrange multipliers, multivariable Optimization with inequality constraints, Kuhn – Tucker conditions.

UNIT III: INTRODUCTION TO LINEAR PROGRAMMING
Standard form of a linear programming problem, geometry of linear programming problems, definitions and theorems, solution of a system of linear simultaneous equations, pivotal reduction of a general system of equations, motivation to the simplex method, simplex algorithm, big M-method, dual simplex algorithm.

UNIT IV: TRANSPORTATION PROBLEM AND ITS VARIANTS
Finding initial basic feasible solution by North–West corner rule, least cost method and Vogel’s approximation method, testing for optimality of balanced transportation problems by u, v – method, Assignment problems, variants, Integer Programming, Branch and bound technique.

UNIT V: UNCONSTRAINED NONLINEAR PROGRAMMING
One-dimensional minimization methods: Classification, Fibonacci method, Problems and Quadratic interpolation method, Problems.

UNIT VI: UNCONSTRAINED OPTIMIZATION TECHNIQUES
UNIT VII : CONSTRAINED NONLINEAR PROGRAMMING
Characteristics of a constrained problem, Classification, Basic approach of Penalty Function method; Basic approaches of Interior and Exterior penalty function methods - Introduction to convex Programming Problem.

UNIT VIII : DYNAMIC PROGRAMMING
Dynamic programming multistage decision processes, types, concept of sub optimization and the principle of optimality, computational procedure in dynamic programming, examples illustrating the calculus method of solution, examples illustrating the tabular method of solution.

TEXT BOOKS:

REFERENCES:
III B.Tech, II Semester
10BT61302 : ROBOTICS AND AUTOMATION

UNIT I : FUNDAMENTALS OF MANUFACTURING AND AUTOMATION
Automation, Types of Automation, Arguments for and against automating, manufacturing industries, manufacturing functions and automation strategies, fundamentals of CAD/CAM.

UNIT II : INTRODUCTION TO ROBOTICS
Human factors in automated factories, An overview of Robotics, Laws of robotics, Industrial Robotics - classification by coordinate system and control system, Electronic and Pneumatic manipulators, Present and Future applications.

UNIT III : POWER SOURCES AND SENSORS
Hydraulic, Pneumatic and electric drivers, Motor HP determination and gearing ratio, variable speed arrangements, Path Determination, Machinery Vision, Ranging, Laser, Acoustic, Magnetic Fiber Optic and Tactile Sensor.

UNIT IV : ACTUATORS AND GRIPPERS
Pneumatic, Hydraulic Actuators, Stepper Motor Control Circuits, End Effector, Various types of Grippers, Design consideration.

UNIT V : KINEMATICS AND DYNAMICS
Differential transformation and manipulators, Jacobians, problems. Dynamics : Lagrange, Euler and Newton, Euler formations, Problems, Forward and Inverse Kinematics Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop.

UNIT VI : ROBOT PROGRAMMING
Robot programming- Lead through methods, textual robot languages, position specification, motion interpolation, Basic programming languages.
UNIT VII : FLEXIBLE MANUFACTURING SYSTEMS AND AUTOMATED MATERIAL HANDLING
Automated material handling and storage systems, conveyor systems and automated guided vehicle systems, FMS workstations, applications and benefits.

UNIT VIII
ROBOT APPLICATIONS IN MANUFACTURING
Multiple Robots, Artificial intelligence and Robotics, Robots in Manufacturing and Non-Manufacturing applications – Robot Cell Design and control.

TEXT BOOKS:
2. S. R. Deb, Robotics Technology and Flexible Automation, TMH.

REFERENCE BOOKS:
III B.Tech, II Semester

10BT61301: DIGITAL CONTROL SYSTEMS

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UNIT-I : SAMPLING AND RECONSTRUCTION:
Introduction - Review of Samling theorem, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT-II : THE Z - TRANSFORMS

UNIT - III : Z- PLANE ANALYSIS OF DISCRETE- TIME CONTROL SYSTEMS
Z-Transform method for solving difference equations; Pulse transfer function, block diagram analysis of sampled – data systems.

UNIT-IV : STATE SPACE ANALYSIS
State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it’s Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state - space equations.

UNIT-V : CONTROLLABILITY AND OBSERVABILITY

UNIT-VI : STABILITY ANALYSIS

UNIT-VII : DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS
Transient and steady state response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, compensators.
UNIT-VIII: STATE FEEDBACK CONTROLLERS AND OBSERVERS
Design of state feedback controller through pole placement - Necessary and sufficient conditions, Ackerman’s formula. Problems State Observers- Full order and Reduced order observers.

TEXT BOOKS:

REFERENCES:
2. M. Gopal, Digital Control and State Variable Methods, TMH.
III B.Tech, II Semester

10BT60411: MICROPROCESSORS AND MICROCONTROLLERS LAB
(Common to EEE, EIE & EConE)

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Any TWELVE experiments to be conducted:

I Programs using 8085
1. Arithmetic operations
2. Logical operations

II Programs using 8086
1. Introduction to MASM/TASM
2. Arithmetic operations
3. Logic operations
4. String operations
5. Modular program: use procedure

III Interfacing Programs with 8086
1. Stepper motor
2. Logic controllers
3. A/D and D/A converter
4. Seven Segment Display
5. Keyboard Interfacing

IV Programs using 8051
1. Arithmetic operations
2. Addition Operation using External Memory
3. Programs using special instruction like SWAP, bit/byte, set/reset etc.
III B.Tech, II Semester

10BT61311: CONTROL SYSTEMS -I LAB

Any TEN experiments to be conducted:

1. Characteristics of synchro transducer, synchro receiver and control transformers.
2. Gain control of the output of DC amplifier with and without chopper stabilization.
3. Torque-displacement characteristics of the stepper motor using Microprocessor.
4. Control characteristics of magnetic amplifier (Series Connected and Parallel connected)
5. Shaft angle encoder, decoder, output characteristics.
6. Response of a first order system, with RC (simulated T/F) components on servo scope.
7. Error comparators-ganged potentiometer and systems potentiometer sensitivity determination.
8. Pneumatically operated PID controller, with independent gain control of PI and D control loops of a step input response.
9. Step function response of the second order system on MATLAB - control of transient and steady state performances.
10. Plotting root locus for a given transfer functions using MATLAB.
11. Plotting Bode diagram for a given transfer functions using MATLAB
12. Obtaining state space model of a classical transfer function using MATLAB.