Bachelor of Technology (Electronics & Communication Engineering)

Scheme of Studies/Examination

Semester III

S. No.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Duration of Exam (Hrs)
			L	T	P	Hours/Week	Theory	Sessional	Practical	Total	
1	AS-201N	Mathematics-III	3	1	0	4	75	25	0	100	3
2	ECE-201N	Signals & Systems	3	1	0	4	75	25	0	100	3
3	ECE-203N	Electronic Devices	3	1	0	4	75	25	0	100	3
4	ECE-205N	Network Analysis & Synthesis	3	1	0	4	75	25	0	100	3
5	ECE-207N	Digital Electronics	3	1	0	4	75	25	0	100	3
6	ECE-209N	Analog Communications	3	1	0	4	75	25	0	100	3
7	ECE-211N	Signals & Systems Lab	0	0	3	3	0	40	60	100	3
8	ECE-213N	Digital Electronics Lab	0	0	3	3	0	40	60	100	3
9	ECE-215N	Analog Communications lab	0	0	3	3	0	40	60	100	3
		Total	**18**	**6**	**9**	**33**	**450**	**270**	**180**	**900**	
10	MPC-201N	Environmental Studies*	3	0	0	3	75	25	0	100	3

** MPC-201N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.*

Bachelor of Technology (Electronics & Communication Engineering)

Scheme of Studies/Examination

Semester IV

S. No.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Duration of Exam (Hrs)
			L	T	P	Hours/Week	Theory	Sessional	Practical	Total	
1	AS-206N	Numerical Analysis	4	0	0	4	75	25	0	100	3
2	ECE-202N	Data Structures & Algorithms	3	1	0	4	75	25	0	100	3
3	ECE-204N	Electronics Measurements & Instruments	3	1	0	4	75	25	0	100	3
4	ECE-206N	Electromagnetic Theory	3	1	0	4	75	25	0	100	3
5	ECE-208N	Analog Electronics	3	1	0	4	75	25	0	100	3
6	ECE-210N	Computer Architecture & Organization	3	1	0	4	75	25	0	100	3
7	ECE-212N	Data Structures Lab	0	0	3	3	0	40	60	100	3
8	ECE-214N	Electronics Measurements & Instruments Lab	0	0	3	3	0	40	60	100	3
9	ECE-216N	Analog Electronics lab	0	0	3	3	0	40	60	100	3
		Total	**19**	**5**	**9**	**33**	**450**	**270**	**180**	**900**	
10	MPC-202N	Energy Studies*	3	0	0	3	75	25		100	3

** MPC-202N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.*

Note: All the students have to undergo six weeks industrial training after IV^{th} semester and it will be evaluated in V^{th} semester.

AS-201N	MATHEMATICS-III					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 hrs**
Purpose	To acquaint the students with the basic use of PDE, Linear Programming problems, Fourier series and transforms, Complex variables and Probability.					
Course Outcomes						
CO1	This section is concerned mainly with Fourier series. However, the underlying ideas can also be extended to nonperiodic phenomena. This leads to Fourier integrals and transforms which are very much useful in solving the initial and boundary value problems.					
CO 2	Students will learn about the formation and solution the partial differential equations. First order PDE of any degree by using Charpit's method will be discussed in details. In addition, how to solve homogeneous linear PDE with constant coefficients and variable separable method and LPP will be covered under this section.					
CO 3	Complex analysis is concerned with generalization of the familiar real functions of calculus and their detailed knowledge is an absolute necessity in practical work to solve engineering problems.					
CO 4	Probability theory provides models of probability distributions(theoretical models of the observable reality involving chance effects) to be tested by statistical methods which has various engineering applications, for instance, in testing materials, control of production processes, robotics, and automatization in general, production planning and so on.					

UNIT-I

Fourier Analysis **(11 hrs)**

Fourier series: Euler's formulae, Orthogonality conditions for the Sine and Cosine funtions, Dirichlet's conditions, Fourier expansion of functions having points of discontinuity, Change of interval, Odd and even functions, Half-range series.

Fourier Transforms: Fourier integrals, Fourier transforms, Fourier Cosine and Sine transforms, Properties of Fourier transforms, Convolution theorem, Parseval's identity, Fourier transforms of the derivative of a function, Application of transforms to boundary value problems (Heat conduction and vibrating string).

UNIT-II

Partial Differential Equations and LPP **(11 hrs)**

Formation and Solutions of PDE, Lagrange's Linear PDE, First order non-linear PDE, Charpit's method, Homogeneous linear equations with constant coefficients, Method of separation of variables.

Solution of linear programming problems: using Graphical and Simplex methods.

UNIT-III

Theory of Complex Variables **(12 hrs)**

A review of concept of functions of a complex variable, Limit, continuity, differentiability and analyticity of a function. Basic elementary complex functions (exponential functions, trigonometric & Hyperbolic functions, logarithmic functions) Cauchy-Riemann Equations.

Line integral in complex plane, definition of the complex line integral, basic properties, Cauchy's integral theorem, and Cauchy's integral formula, brief of Taylor's, Laurent's and Residue theorems (without proofs).

UNIT-IV

Probability theory: **(11 hrs)**

A review of concepts of probability and random variables: definitions of probability, addition rule, conditional probability, multiplication rule, Conditional Probability, Mean, median, mode and standard deviation, Bayes' Theorem, Discrete and continuous random variables, probability mass, probability density and cumulative distribution functions, mathematical expectation, moments, moment generating function.

Standard Distributions: Binomial, Poisson and Normal distribution.

References Books:

1. E. Kreyszig : Advanced Engineering Mathematics, Wiley India.
2. B. V. Ramana: Engineering Mathematics, Tata McGraw Hill.
3. R.K. Jain, S.R.K. Iyengar: Advanced Engineering Mathematics, Taylor & Francis.
4. Murray R Spiegel: Schaum's Outline of Complex Variables, McGraw Hill Professional.
5. Michael D. Greenberg: Advanced Engineering Mathematics, Pearson Education, Prentice Hall.

Note: The Examiners will set nine questions: first question will be short answer type (covering the entire syllabus) and another eight questions will be set taking two questions from each unit. Students will have to attempt five questions in all; first question will be compulsory and other four questions, selecting one from each unit. All questions will carry equal marks.

ECE-201N	Signals and Systems					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the basic concepts of signals and systems, Random variables, discretisation of analog signals, fourier series, fourier transform and laplace transform.**					
Course Outcomes						
CO1	**Introduce and classify signals and systems based on their properties.**					
CO2	**To understand the basic concepts of random variables and Linear time invariant systems.**					
CO3	**Familiarization with the sampling process and spectral analysis of signals using fourier series.**					
CO4	**Apply transform techniques to analyze continuous-time and discrete-time signals and systems**					

Unit-I

Introduction to Signals: Continuous and discrete time signals, deterministic and stochastic signals, periodic and a periodic signals, even and odd signals, energy and power signals, exponential and sinusoidal signals and singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation

Introduction to Systems: Linear and non-linear systems, time invariant and time varying systems, lumped and distributed systems,deterministic and stochastic systems, casual and non-causal systems, analog and discrete/digital memory and memory less systems.

Unit-II

Random Variables: Introduction to Random Variables, pdf, cdf, moments, distributions, correlation functions.

Linear Time Invariant Systems: Introduction to linear time invariant (LTI) systems, properties of LTI systems, convolution integral, convolution sum, causal LTI systems described by differential and difference equations. Concept of impulse response

Unit-III

Discretisation of Analog Signals: Introduction to sampling, sampling theorem and its proof.Effect of undersampling, reconstruction of a signalfrom sampled signal.

Fourier Series : Continuous time fourier series (CTFS), Properties of CTFS, Convergence of fourier series, Discrete time Fourier Series (DTFS), Properties of DTFS **,** Fourier series and LTI system, Filtering.

Unit-IV

Fourier Transform: Continuous Time Fourier Transform (CTFT), Properties of CTFT, Systems characterized by linear constant- coefficient differential equations.

Discrete time fourier transform (DTFT), Properties of DTFT, Duality, Systems characterized by Linear constant coefficient difference equations.

Laplace Transform: Introduction to Laplace transform, Region of convergence for laplace transform, Inverse laplace transform, Properties oflaplace transform, Analysis and characterization of LTI systems using laplace transform, System function algebra and block diagram representations, Unilateral laplace transform.

Text Books:

1. Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, Signals and Systems, Prentice Hall India, 2nd Edition, 2009

Reference Books:

1. Simon Haykins – “Signal & Systems”, Wiley Eastern
2. Tarun Kumar Rawat , Signals and Systems , Oxford University Press.

Note: Question paper template will be provided to the paper setter.

ECE - 203N	Electronic Devices					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the various electronic devices such as various types of diodes, BJT's, FET's and regulated power supplies.**					
Course Outcomes						
CO1	**To understand the concept of carrier transport phenomena in semiconductors and various diodes such as p-n junction diode, tunnel diode and schottky diodes.**					
CO2	**To understand the detailed concept of BJT's and calculation of parameters of transistors using different models.**					
CO3	**Describe the characteristics & parameters of FET's and MOSFET's.**					
CO4	**To understand the concept of different types of regulated power supplies.**					

Unit- I

Carrier Transport Phenomena: Carrier Drift, Carrier Diffusion, Hall Effect, Mobility and Resistivity. Generation and Recombination of carriers, Fermi energy level, its position and its variation with doping concentration.**PN Junction**: Basic Structure, Built in potential Barrier, Electric Field, Space charge width, Junction capacitances: Depletion & Diffusion Capacitance, Small signal model of PN Junction Diode. Tunnel Diode, Schottky Diode**.**

Unit- II

Bipolar Junction Transistor: Basic principle of operation, Forward Active mode & other modes. Non Ideal Effects: Base Width Modulation, Current Crowding, High Injection. Ebers-Moll Model, Frequency Limitations of BJT'S, Hybrid Pi Model, Introduction to H-Parameters, Hetrojunction Bipolar Transistors.

Unit -III

Field Effect Devices: JFET concepts, Basic Operation, Internal pinch off voltage, Pinch off voltage, Ideal DC current voltage relationship, Transconductance, Channel length modulation, velocity saturation effects, Small Signal Model & Frequency Limitations.Two Terminal MOS structure, Energy band diagrams, Depletion layer thickness, Capacitance Voltage Relationship, Basic MOSFET operation, Small Signal Model.

Unit-IV

Regulated Power Supplies: Voltage Regulation, Zener diode shunt voltage regulator, Transistor series and Transistor shunt voltage regulator, Controlled Transistor Voltage Regulator, Op-Amp Series voltage regulator, Complete power supply and SMPS.

Text Books:

1. D. A. Neamen,DhrubesBiswas Semiconductor Physics and Devices (IRWIN), McGraw Hill Higher Education, 4th Edition
2. B.G. Streetman, Solid State Electronic Devices, Prentice Hall of India, New Delhi, 1995.

Reference Books:

1. E S. Yang, Microelectronic Devices, McGraw Hill, Singapore, 1988.
2. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.
3. Millman&Halkias: Integrated Electronics, TMH.
4. Boylestad&Nashelsky: Electronic Devices & Circuit Theory, PHI.

Note: Question paper template will be provided to the paper setter.

ECE-205N	Network Analysis and Synthesis					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of topology, transient analysis, network modeling, filters and methods of network analysis and synthesis for solving simple and complex circuits.**					
Course Outcomes						
CO1	**To understand the concept of network topologies and the network analysis in the time domain for solving simple and complex circuits.**					
CO2	**Describe the circuit element models, network analysis using Laplace transform and time domain behavior from the pole-zero plots.**					
CO3	**Describe the characteristics & parameters of two port networks.**					
CO4	**To understand the concept of filters and synthesis of one port network.**					

Unit -I

Introduction: Principles of network topology, graph matrices, Network Analysis (Time-Domain): Singularity Functions, Source-Free RC, RL, Series RLC, Parallel RLC circuits, Initial & Final Conditions, Impulse & Step Response of RC, RL, Series RLC, Parallel RLC circuits.

Unit-II

Network Analysis (using Laplace Transform): Circuit Element Models, Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

Network Functions: Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions.

Unit-III

Characteristics and Parameters of Two Port Networks: Relationship of two-port variables, short-circuit admittance parameters, open circuit impedance parameters, transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

Unit-IV

Types of Filters and their Characteristics: Filter fundamentals, constant-k and m-derived low-pass and high-pass filters.

Network Synthesis: Causality & Stability, Hurwitz Polynomials, Positive real functions, Synthesis of one port networks with two kind of elements.

Text Books:

1. Fundamentals of Electric Circuits: Charles K. Alexander, Matthew N. O. Sadiku, McGraw Hill Education
2. Network Analysis: M.E. Van Valkenburg, PHI

Reference Books:

1. Circuits & Networks: Sukhija & Nagsarkar, Oxford Higher Education.
2. Network Analysis & Synthesis: F. F. Kuo, John Wiley.
3. Basic Circuit Theory: Dasoer Kuh, McGraw Hill Education.
4. Circuit Analysis: G.K. Mithal; Khanna Publication

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Note: Question paper template will be provided to the paper setter.

ECE-207N	Digital Electronics					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of Digital Electronics covering the contents of digital techniques, logic gates & logic families etc.**					
Course Outcomes						
CO1	**Students will be able to design a minimum circuit for any function**					
CO2	**Students will be able to analyze various logic families available to design digital components**					
CO3	**Students will be able to design state machine circuits using sequential and combinational circuits**					
CO4	**Students will be able to understand the basics of various PLD's.**					

Unit-I

Introduction to Digital Techniques: Digital Systems; Logic circuits, Analysis, design and implementation of digital systems, Number Systems and Codes- Positional number system; Binary, octal and hexadecimal number systems; Methods of base conversions; Binary, octal and hexadecimal arithmetic; Representation of signed numbers; Fixed and floating point numbers; Binary codes: BCD codes, Excess-3, Gray codes; Error detection and correction codes - parity check codes and Hamming code.

Combinatonial Design using Gates: Combinatonial Logic Systems: Definition and specification; Truth table; Basic logic operation and logic gates. Basic postulates and fundamental theorems of Boolean algebra;Standard representation of logic functions : SOP and POS forms; Simplification of switching functions using K-map and Quine-McCluskey tabular methods; Synthesis of combinational logic circuits using AOI, NAND,NOR and other combination of other logic functions.

Unit-II

Logic families: Introduction to different logic families; Operational characteristics of BJT in saturation and cut-off regions; Operational characteristics of MOSFET as switch; TTL inverter - circuit description and operation; CMOS inverter - circuit description and operation; Structure and operations of TTL ,CMOS and ECL gates; Electrical characteristics of logic gates – logic levels and noise margins, fan-out, propagation delay, transition time, power consumption and power-delay product; interfacing of TTL and CMOS families.

Combinational design using MST devices: Encoders, Decoders, multiplexers, demultiplexers and their use as logic elements; Parity circuits and comparators; Arithmetic modules- adders, subtractors , BCD arithmetic circuits.

Unit-III

Sequential circuits: Definition of state machines, state machine as a sequential controller; Basic sequential circuits- latches and flip-flops: SR-latch, D-latch, D flip-flop, JK flip-flop, T flip-flop; Timing hazards and races; Analysis of state machines using D flip-flops and JK flip-flops; Design of state machines - state table, state assignment, transition/excitation table, excitation maps and equations, logic realization;

State machine design: Designing state machine using ASM charts, Designing state machine using state diagram, Design of registers, counters-asynchronous and synchronous, up/down counter, Ring and Johnson counters.

Unit-IV

Memory – Organization, Functional Diagram, Memory operations, Classification of semiconductor memories, Read and Write Memories, ROM, Programmable Logic Devices-PLAs, PALs and their applications, Generic Array logic devices, Sequential PLDs and their applications; Introduction to field programmable gate arrays (FPGAs) and ASICS.

Text Books:

1. G.K.Kharate: Digital Electronics,1st edition, Oxford university press, 2010

Reference Books:

1. M.M.Mano and M.D.Ciletti: Digital design4th edition, Printece Hall.2006
2. R.P.Jain: Modern Digital Electronics, 3rd edition, TMH.2003
3. A.A.Kumar: Fundamentals of digital circuits,2nd edition, Printece Hall of India
4. A.P.Malvino and D.P.Leach: Digital principles and applications,6th edition,TMH,2008
5. Z. Kohavi, Switching and Finite Automata Theory, McGraw Hill, 1970.

Note: Question paper template will be provided to the paper setter.

ECE-209N	Analog Communications					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of basic communication systems and various noises in that system, different analog modulation techniques and also AM&FM transmission & reception with various pulse techniques.**					
Course Outcomes						
CO1	**To understand the concept of basic comm. System and various types of noise and analog modulation techniques.**					
CO2	**To understand the concept of AM transmission & reception.**					
CO3	**To understand the concept of FM transmission & reception.**					
CO4	**To understand the concept of SSB transmission & reception and analog pulse techniques.**					

Unit-I

Communication Systems and Noise: Constituents of communication system, Modulation, Bandwidth requirement, Noise, Classification of noise, Resistor noise, Multiple resistor noise sources, Network with reactive elements, Noise Temperature, Noise bandwidth, Noise figure, its calculation and measurement, Bandpass noise representation, Noise calculation in Communication Systems, Noise in Amplitude Modulated System, Noise in angle modulated systems, SNR calculation for AM and FM.

Analog Modulation Techniques: Theory of amplitude modulation, AM power calculations, AM modulation with a complex wave, Concepts of angle modulation, Theory of frequency modulation, Mathematical analysis of FM, Spectra of FM signals, Narrow band FM, Wide band FM, Phase modulation, Phase modulation obtained from frequency modulation, Comparison of AM, FM & PM.

Unit-II

AM Transmission: Generation of Amplitude Modulation, Low level and high level modulation, Basic principle of AM generation, Square law modulation, Amplitude modulation in amplifier circuits, Vander bijl modulation, Suppressed carrier AM generation (Balanced Modulator) ring Modulator, Product Modulator/balanced Modulator.

AM Reception: Tuned Ratio Frequency (TRF) Receiver, Super heterodyne Receiver, RF Amplifier, Image Frequency Rejection, Cascade RF Amplifier, Frequency Conversion and Mixers, Tracking & and Alignment, IF Amplifier, AM detector, AM detector with AGC, Distortion in diode detectors, Double hetro-dyne receiver, AM receiver using a phase locked loop (PLL), AM receiver characteristics.

Unit-III

FM Transmission: FM allocation standards, Generation of FM by direct method, Varactor diode Modulator, Indirect generation of FM, The Armstrong method RC phase shift method, Frequency stabilized reactance FM transmitter, FM stereo transmitter, Noise triangle.

FM Reception: Direct methods of Frequency demodulation, Travis detector/frequency discrimination (Balanced stop detector), Foster seelay of phase discriminator, Ratio detector, Indirect method of FM demodulation, FM detector using PLL, Pre-emphasis / de-emphasis, Limiters, The FM receiver, RF

Amplifier, FM stereo receiver, Square, Triangular, Sinusoidal FM generation Voltage controlled oscillator.

Unit-IV

SSB Transmission: Introduction, Advantages of SSB Transmission, Generation of SSB, The Filter method The Phase Shift Method, The Third Method, AM Compatible SSB Modulation, Pilot Carrier SSB, Independent Side-band Systems (ISB), Vestigial Side-band Modulation (VSB), VSB-SC, Application of AM and FM in TV transmission.

SSB Reception: SSB Product Demodulator, Balanced Modulator as SSB Demodulator, Pilot Carrier SSB Receiver, SSB Double Super-hetrodyne Receiver, Compatible SSB (CSSB) Receiver, ISB/Suppressed Carrier Receiver, Modern Communication Receiver.

Analog Pulse Modulation: Introduction, Pulse amplitude modulation (PAM), Natural PAM Frequency Spectra for PAM, PAM Time Multiplexing Flat-top PAM, PAM Modulator Circuit, Demodulation of PAM Signals, Pulse Time Modulation (PTM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), PPM Demodulator,

Text Books:

1. Proakis, J. G. and Salehi, M., Fundamentals of Communication Systems, Dorling Kindersley (2008) 2nd ed.
2. Mithal G K, Radio Engineering, Khanna Pub.

Reference Books:

1. Taub, H., Principles of Communication Systems, McGraw-Hill (2008) 3rd ed.
2. Haykin, S., Communication Systems, John Willey (2009) 4th ed
3. Kennedy, G., Electronic Communication Systems, McGraw-Hill (2008) 4th ed.

Note: Question paper template will be provided to the paper setter.

ECE-211N	Signals and Systems Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**
Course Outcomes						
CO1	**To understand the basic concepts of MATLAB**					
CO2	**To explore properties of various types of signals and systems.**					
CO3	**To visualize the relationship between continuous and discrete fourier transforms.**					
CO4	**To understand the concept of sampling in time and frequency domain.**					

List of Experiments:

1) To demonstrate some simple signal.

2) To explore the effect of transformation of signal parameters (amplitude-scaling, time-scaling and time-shifting).

3) To explore the various properties of the impulse signals.

4) To visualize the complex exponential signal and real sinusoids.

5) To identify a given system as linear or non-linear.

6) To explore the time variance and time invariance property of a given system.

7) To explore causality and non-causality property of a system.

8) To visualize the relationship between the continuous-time Fourier series and Fourier transform of a signal.

9) To visualize the relationship between the discrete-time Fourier series and Fourier transform of a signal.

10) To visualize the relationship between continuous-time and discrete-time Fourier transform of a signals.

11) To demonstrate the time domain sampling of bandlimited signals (Nyquist theorem).

12) To demonstrate the time domain sampling of non-bandlimited signals and antialiasing filter.

13) To demonstrate the signal reconstruction using zero-order hold and first-order hold filters.

14) To demonstrate the sampling in frequency domain (Discrete Fourier Transform).

15) To demonstrate the spectral analysis using Discrete Fourier Transform.

17) To demonstrate the convolution and correlation of two continuous-time signals.

18) To demonstrate the convolution and correlation of two discrete-time signals.

ECE-213N	Digital Electronics Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**

Course Outcomes	
CO1	**To understand the concept of TTL gates such as AND, OR, NAND etc.**
CO2	**To study and verify various combinational circuits such as multiplexers, Comparators etc.**
CO3	**To understand the concept of sequential circuits such as flip flops, counters etc.**
CO4	**To design the state machine of four states and to study a sequence detector.**

List of Experiments:

1. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design and realize a given function using K-Maps and verify its performance.
3. To verify the operation of Multiplexer and Demultiplexer.
4. To verify the operation of 2 bit Comparator using gates.
5. To verify the truth table of S-R, J-K, T, D Flip-flops.
6. To verify the operation of Bi-directional shift register.
7. To design and verify the operation of 3-bit asynchronous counter.
8. To design and verify the operation of asynchronous Up/down counter using J-K FFs.
9. Design a state machine of 4 states.
10. To design a sequence detector.

ECE-215N	Analog Communications Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**
Course Outcomes						
CO1	**To study various modulation techniques of Amplitude modulation and also demodulation.**					
CO2	**To study the generation techniques of SSB and DSBSC modulation**					
CO3	**To understand the concept of PLL , its capture range and frequency multiplier using PLL.**					

List of Experiments:

1. i) To study Double Sideband Amplitude Modulation and determine its modulation factor and power in sidebands.
   ii) To study amplitude demodulation by linear diode detector.
2. i) To study Frequency Modulation and determine its modulation factor.
   ii) To study PLL 565 as frequency demodulator
3. To study Sampling and reconstruction of pulse amplitude modulation system.
4. To study the Sensitivity characteristics of superhetrodyne receiver.
5. To study the Selectivity characteristics of superhetrodyne receiver.
6. To study the Fidelity characteristics of superhetrodyne receiver.
7. i) To study Pulse Amplitude Modulation
   a) Using switching method
   b) By sample and hold circuit.

   ii) To demodulate the obtained PAM signal by IInd order Low pass filter.
8. To study Pulse Width Modulation / Demodulation.
9. To study Pulse Position Modulation / Demodulation.
10. To study active filters (Low-pass, High-pass, Band-pass, Notch filter).

MPC-201N	Environmental Studies (B.Tech. All Branches Semester –III/IV)					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**0**	**0**	**75**	**25**	**100**	**3 Hrs.**
Purpose	**To learn the multidisciplinary nature, scope and importance of Environmental Studies**					
Course Outcomes						
CO1	**Basic concepts of Various kinds of Microscopy and Centrifugation Techniques**					
CO2	**To learn the theoretical and practical aspects of Electrophoresis and Chromatography Techniques**					
CO3	**To learn the concepts of different kinds of Spectroscopy and Colourimetry**					
CO4	**To understand the concept of radioisotope techniques and their applications in research**					

UNIT 1

The multidisciplinary nature of environmental studies.Definition, Scope and Importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

(a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber eztraction, mining, dams and their effects on forests and tribal people.
(b) Water Resources- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral Resources- Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food Resources- World Food Problems, changes caused by agriculture and overgazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy Resources- Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
(f) Land Resources- Land as a resource, land, degradation, man induced landslides, soil erosion and desertification.

Role of an individual in conservation of natural resources.Equitable use of resources for sustainable lifestyle.

UNIT II

Ecosystem-Concept of an ecosystem.Sturcture and function of an ecosystem.Producers, consumers and decomposers.Energy flow in the ecosystem.Ecological Succession.Food Chains, food webs and ecological pyramids. Introduction, types,characteristic features, structure and function of the following ecosystem-

a. Forest Ecosystem
b. Grassland Ecosystem
c. Desert Ecosystem
d. Aquatic Ecosystems(ponds, streams, lakes, rivers, oceans, esturaries

Field Work. Visit to a local area to document Environment assets-river/forest/grassland/hill/mountain.Visit to a local polluted site- Urban /Rural

Industrial/Agricultural.Study of common plants, insects and birds. Study of simple ecosystems-pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

Biodiversity and its conservation. Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversityof global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity. Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts. Endangered and endemic species of India.Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution Defiinitiom. Cause, effects and control measures of- (a) Air Pollution (b) Water Pollution (c) Soil Pollution (d) Marine Pollution (e) Noise Pollution (f) Thermal Pollution (g) Nuclear Hazards
Solid waste management- cause, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides

UNIT IV

Social Issues and the Environment.From unsustainable to sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people: Its problems and concerns. Case Studies.Environmental ethics-issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.Wasteland Reclamation.Consumerism and waste products.Environment Protection Act.Air (Prevention and Control of Pollution) Act.Water (Prevention and Control of Pollution) Act.Wildlife Protection Act.Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public Awareness. Human population and the Environment.Population growth, variation amomg nations. Population explosion-Family Welfare Programme. Enviromments nd human health.Human rights.Value Education.HIV/AIDS, Women and Child Welfare.Role of Information Technology in Environment and Human Health.Case Studies.

Text Books

1. Environmental Studies- Deswal and Deswal. Dhanpat Rai & Co.
2. Environmental Science & Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India
3. Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
4. Environmental Science- Botkin and Keller. 2012. Wiley , India

AS-206N	NUMERICAL ANALYSIS					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
4	**0**	**0**	**75**	**25**	**100**	**3 hrs**
Purpose	To acquaint the students with the complete procedure to numerically approximate the solution for different kinds of problems occur in science, engineering and technology whose exact solution is difficult to find.					
Course Outcomes						
CO1	In this section student will learn the methods to find the roots of nonlinear (algebraic or transcendental) equations, and eigen value problem of a matrix that can be obtained numerically where analytical methods fail to give solution.					
CO2	Students will learn to solve a large system of linear equations and matrix inversion by various numerical methods and techniques.					
CO3	Discussion on interpolation will be useful in constructing approximate polynomial to represent the huge amounts of experimental data, and to find the intermediate values. Numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.					
CO4	Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations will be useful in attempting many engineering problem.					

UNIT - I

Solution of Algebraic and Transcendental Equation and Eigen Value Problem: Solution of algebraic and transcendental equation by the method of bisection, the method of false position, Newton-Raphson method and Graeffe's Root squaring method. Eigen value problem by power method and Jacobi method.

UNIT-II

Solution of System of Equations and Matrix Inversion: Solution of linear algebraic equation: Gauss elimination and Gauss-Jordan methods- Method of Triangularization and Crout's reduction. Iterative methods: Gauss-Jacobi, Gauss-Seidel and Relaxation methods. Matrix inversion by Gauss - Jordan elimination, Crout's , Doolittle and Choleski Methods.

UNIT-III

Interpolation: Finite Differences, Relation between operators - Interpolation by Newton's forward and backward difference formulae for equal intervals. Newton's divided difference method and Lagrange's method for unequal intervals. Gauss Central difference formulae, Bessel and Stirling formulae.

Numerical differentiation: Newton's forward difference formula to compute derivatives, Newton's backward difference formula to compute derivatives, Derivatives using Central difference formulae, to find the maxima and minima of a tabulated function.

Numerical Integration: by Newton's Cotes formulae, Trapezoidal and Simpson's $1/3^{rd}$ and $3/8^{th}$ rules, Romberg method.

UNIT-IV

Solution of Ordinary Differential Equation: Single step methods: Taylor series method, Picard's method of successive approximation, Euler, Modified Euler's and Improved Euler methods, Runge Kutta method of fourth order only. Multistep methods: Milne and Adams– Bashforth methods.

Curve fitting: Introduction, Principle of Least squares, Method of Least squares, Fitting of a straight line, parabola and exponential functions.

References Books:

- M. K. Jain, SRK Iyengar and R.K. Jain, Numerical Methods For Scientific & Engg 6e, New Age International (P) Ltd (2008), ISBN-13:978-8122420012.

- Kendall E. Atkinson, An Introduction to Numerical Analysis, Wiley; 2 edition, (January 17, 1989), ISBN-10: 0471624896 , ISBN-13: 978-0471624899.
- S. C. Chapra and Raymond P Canale, Numerical Methods for Engineers, Tata McGraw Hill, Indian Edition.
- James Scarborough, Numerical Mathematical Analysis, Oxford & IBH Publishing Co. Pvt. Ltd (1950), ISBN 10: 0009780021, ISBN-13:978-0009780021.
- C.F. Gerald and O.P. Wheatley, Applied Numerical Analysis, Addison Wesley; 7 edition (2003), ISBN-13:978-0321133045.

Additional Readings:

- S.S. Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd. (2007), ISBN-13: 978-8120327610.
- Babu Ram, Numerical Methods, Pearson, ISBN 978-8-317-3221-2.
- P.Thangaraj, Computer Oriented Numerical Methods, PHI, ISBN 978-81-203-3539-4.

Note: The Examiners will set nine questions: first question will be short answer type (covering the entire syllabus) and another eight questions will be set taking two questions from each unit. Students will have to attempt five questions in all; first question will be compulsory and other four questions, selecting one from each unit. All questions will carry equal marks.

ECE-202N	Data Structures & Algorithms					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of C basics, and basic algorithms using data structures such as searching and sorting, operations of linked lists and basics of trees and graphs.**					
Course Outcomes						
CO1	**Students will be able to recall 'C' basics and design basic algorithms using various data structures**					
CO2	**Students will be able to design implement various searching and sorting algorithms on arrays.**					
CO3	**Students will be able to use pointers to perform various operations of linked lists**					
CO4	**Students will be able to understand the basics of trees and Graphs.**					

Unit-I

Overview of 'C': History, Characters used in 'C", Data Types, 'C' Tokens, Structures of 'C' program, Operators and Expressions, Flow of Control, I/O functions, Arrays, Structures, user defined data types
Introduction: Overview, Concept of Data Structures, Design of suitable Algorithm, Algorithm analysis

Unit-II

Arrays - Searching and Sorting: Introduction, 1-D arrays - addressing an element in an array, array traversal, insertion and deletion, Multi-D arrays, representation of arrays in physical memory, application of arrays, Searching algorithms: linear search, binary search. Sorting algorithms: selection sort, insertions sort, bubble sort, shell sort, merge sort, radix sort (Algorithm and Analysis).
Stacks and Queues: Stacks operations, Applications of Stacks – Arithmetic operations using Infix to prefix and postfix notations, their conversion and evaluation, Queues operations, Circular, Priority queue and Deque.

Unit-III

Pointers: Introduction, Pointer variables, pointers and arrays, array of pointer, pointers and structures, Dynamic allocation
Linked Lists: Introduction, linked lists, operations on linked lists (Creation, Traversing, Searching, Insertion and Deletion), Circular and doubly linked list, Linked Stacks and Linked Queues, Comparison of sequential and linked storage.

Unit- IV

Trees: Binary Trees, representation of trees (Linear and linked), Traversal of binary trees. Types of binary trees: Expression tree, Binary search tree, Heap tree, threaded binary trees.
Graphs: Introduction, Graph terminology, various representations of Graphs, operations: Insertion, Deletion and traversal.

Text Books:

1. Data Structures using C by A. K. Sharma , Pearson Publication
2. Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH.

Reference Books:

1. Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub
2. Data Structures and program design in C by Robert Kruse, PHI Expert Data Structures with C by R.B. Patel

Note: Question paper template will be provided to the paper setter.

ECE-204N	Electronics Measurements and Instruments					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of Electronics Measurements like measurement of voltage, current & resistance etc.**					
Course Outcomes						
CO1	**Students will learn the techniques of measurement of resistance using different bridges**					
CO2	**AC Bridges & Voltage Indicating & Recording Devices will be introduced to the students**					
CO3	**Students will be able to recognize the functioning of different Analog & Digital Instruments**					
CO4	**Transducers & Data Acquisition Systems will be introduced to the students**					

Unit-I

Measurement and Error: Functional elements and generalized configuration of a measuring Instrument, Characteristics of instruments, errors in measurements and their statistical analysis.

Measurement of Resistance: Wheat stone bridge, Carey-Foster Bridge, Kelvin double bridge, Measurement of Insulation resistance.

Unit-II

A-C Bridges: Maxwell Inductance bridge. Maxwell Inductance Capacitance Bridge, Anderson's Bridge, Hay's Bridge, De-Sauty's Bridge, Schering's bridge and Wein's bridge.

Voltage Indicating and Recording Devices: Analog voltmeters and Potentiometers, Self balancing potentiometer and X-Y recorders, Galvanometers - Oscillographs, Cathode - Ray Oscilloscopes, Magnetic Tape Recorders.

Unit-III

Electronic Instruments: Wave analyzer, Distortion meter: Q-meter. Measurement of Op-Amp parameters.

Digital Instruments: Digital Indicating Instruments, Comparison with analog type, digital display methods, digital methods of time and frequency measurements, digital voltmeters.

Unit-IV

Transducers: Classification of Transducers, Strain Gauge, Displacement Transducers - Capacitive Transducers, LVDT, Piezo-electric Transducers, Temperature Transducers – resistance thermometer, Thermocouples and Thermistors, Liquid level measurement Low pressure (vacuum) measurement.

Data Acquisition Systems: A to D and D to A converters, Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry.

Text Book:

1. A Course in Electrical and Electronics Measurements and Instrumentation: A.K. Sawhney; Dhanpat Rai & Sons.

Reference Books:

1. Electronics Instrumentation and Measurement Techniques: Cooper W.D & Helfrick A.D.; PHI
2. Doeblin E.O., Measurement Systems: Application & Design, Mc Graw Hill.

Note: Question paper template will be provided to the paper setter.

ECE-206N	Electromagnetic Theory					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of Electric & Magnetic Fields and make them understand the phenomenon of propagation of electromagnetic waves.**					
Course Outcomes						
CO1	**Basics of electrostatics including dielectric properties will be covered.**					
CO2	**Basics of magneto-statics and Maxwell's equations will be covered.**					
CO3	**Fundamentals of Uniform plane waves and their propagation in different mediums will be covered.**					
CO4	**Fundamentals of Transmission Lines and different modes of wave propagation in waveguides will be covered.**					

Unit-I

Electric Field and Current: Introduction to Vectors:Addition, Subtraction, Multiplication & Differentiation. Coordinate Systems: Rectangular, Cylinderical & Spherical. Coulomb's law. Electric Field Intensity, Electric Potential,Field of a Line Charge, Field of a Sheet of Charge, Electric Flux Density,Electric Dipole, Current Density, Continuity of Current, Gauss's Law and Applications, Electric Field Behaviour in Dielectrics, Boundary Conditions at Interface between Two Dielectrics, Method of Images,Capacitance of Two Wire Line, Poisson's and Laplace's Equations, Uniqueness Theorem.

Unit-II

Magnetic Field and Maxwell Equations: Biot - Savart Law. Ampere's law, Magnetic Vector potentials, Force on a moving charge, Differential Current Element, Force and Torque on a Closed Circuit, Magnetic Boundary Conditions, the Magnetic Circuit,Faraday's Law, Maxwell's Equations in Point and Integral form for Free space, Good Conductors & Lossy Dielectric for Sinusoidal Time Variations& Static Fields, Retarded potentials.

Unit-III

The Uniform Plane Wave: Plane Waves & its Properties, Wave Equation for Free Space and Conducting Medium, Propagation of Plane Waves in Lossy Dielectrics,Good Dieletrics& Good Conductors. The Poynting Vector and Power considerations, Skin Effect, Reflection of Uniform Plane Waves (Normal & Oblique Incidence).

Unit-IV

Transmission Lines and Waveguides: The Transmission Line Equations, Graphical Methods, Smith chart, Time-domain and Frequency- domain Analysis, Reflection in Transmission Lines, SWR. TE, TM, TEM waves, TE and TM modes in Rectangular and Circular Waveguides, Cut-off & Guided Wavelength, Wave Impedance and Characteristic Impedance, Dominant Modes, Power Flow in waveguides, Excitation of Waveguides, Dielectric Waveguides.

Text Books:

1. Hayt W H., Engineering Electromagnetics, Tata McGraw Hill, 6th Edition.

References Books:

1 Jordan E C & Balmain K G, Electromagnetic Waves and Radiating Systems, PHI.2 David K. Chang, Field and Waves Electromagnetics, Addison Wesley.

Note: Question paper template will be provided to the paper setter.

ECE-208N	Analog Electronics					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of various models of BJT's and FET's, multistage amplifiers, concept of feedback and its topologies, oscillators and detail of operational amplifiers with its applications.**					
Course Outcomes						
CO1	**To understand the concept of various amplifiers using BJT and FET and various transistor models**					
CO2	**Describe the frequency response of multistage amplifiers and the detailed concept of feedback topologies.**					
CO3	**To understand the concept of Barkhausen criteria of oscillation and various RC and LC oscillators and their frequency of oscillation.**					
CO4	**To understand the concept of Operational amplifier and its various applications such as current mirror, Schmitt trigger and various op-amp parameters.**					

Unit -I

Amplifier Models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier. Biasing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB/CG, CC/CD) and their features, small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance, output resistance etc., design procedure for particular specifications, low frequency analysis of multistage amplifiers.

Unit -II

Transistor Frequency Response: High frequency transistor models, frequency response of single stage and multistage amplifiers, cascode amplifier. Various classes of operation (Class A, B, AB, C etc.), their power efficiency and linearity issues.

Feedback Topologies: Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.

Unit -III

Oscillators: Review of the basic concept, Barkhausen criterion for oscillators,type of RC oscillators : RC phase shift oscillator , Wien bridge oscillator , LC oscillators : Hartley oscillator, Collpit oscillator , Clapp oscillator ,555 Timer as a monostable and astable multivibrator.

Unit -IV

Op-Amp Applications: Schmitt trigger and its applications. Current mirror: Basic topology and its variants, V-I characteristics, output resistance and minimum sustainable voltage (VON), maximum usable load. Differential amplifier: Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OP-AMP design: design of differential amplifier for a given specification, design of gain stages and output stages.

Text Books:

1. Electronic Devices and Circuits by Millman and Halkias, McGraw Hills, New Delhi

Reference Books:

1. Operational Amplifiers and Linear Integrated Circuits by Ramakant A Gayakwad,PHI.
2. A.S. Sedra & K.C.Smith, Microelectronics Circuits, Oxford University Press
3. Robert L. Boylestad & Louis Nashelsky, Electronic Devices & Circuit Theory,Pearson

Note: Question paper template will be provided to the paper setter.

ECE-210N	Computer Architecture & Organization					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**1**	**0**	**75**	**25**	**100**	**3 Hr.**
Purpose	**To familiarize the students with the concepts of basic structure of computer hardware & software, Control & processor design and memory & system organisation.**					
Course Outcomes						
CO1	**To understand the concept of basics of computer hardware & software**					
CO2	**To understand the concept of control design & processor design**					
CO3	**To familiarize with the concept of various memory systems.**					
CO4	**To familiarize with the concept of system organisation.**					

Unit-I

Basic Structure of Computer Hardware and Software: Introduction to basic computer architecture, register transfer, bus and memory transfers, arithmetic, logic and shift micro operations.

Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes, data transfer and manipulation, program control, RISC, Macros and Subroutines.

Unit-II

Control Design: Micro programmed control, control memory, address sequencing, micro program example, design of control unit, Hardwired Control: design methods, Multiplier Control Unit, CPU Control unit.

Processor Design: Decimal arithmetic unit – BCD adder, BCD subtraction, decimal arithmetic operations, ALU design, Forms of Parallel processing classification of Parallel structures, Array Processors, Structure of general purpose Multiprocessors.

Unit-III

Memory Organization:

Memory hierarchy, main memory, auxillary memory, associative memory,cache memory, virtual memory, memory management, hardware multiprocessor architectures and their characteristics, interconnection structures, Random access memories: semiconductor RAMS, Serial – access Memories – Memory organization, Main Memory Allocation.

Unit-IV

System Organization:

Pipeline and Vector Processing: Parallel processing, pipelining, arithmetic pipeline, instruction pipeline, RISC pipeline, vector processing, array processors, Input-output Organisation: Peripheral devices, input-output interface, asynchronous data transfer, modes of transfer, priority interrupt,DMA, IOP serial communication.

Text Books:

1. Morris Mano, “Computer System Architecture”, PHI.
2. J.F. Heys, “Computer Organization and Architecture”, TMH.

Reference Books:

1. J. Hennessy and D. Patterson, Computer Architecture A Quantitative Approach, 3rd Ed, Morgan Kaufmann, 2002.

Note: Question paper template will be provided to the paper setter.

ECE-212N	Data Structures Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**

Course Outcomes	
CO1	**Students will be able to recall 'C' basics and design basic algorithms using various data structures**
CO2	**Students will be able to design implement various searching and sorting algorithms on arrays.**
CO3	**Students will be able to use pointers to perform various operations of linked lists**
CO4	**Students will be able to understand the basics of trees and Graphs.**

List of Experiments:

1. Write a program to print a 2D array.
2. Write a program to find the factorial of an n^{th} number using recursion.
3. Write a program to print Fibonacci sequence.
4. Using clock() function of time.h header file, compare the timings of linear search and binary search for an 1D array of 1000 elements
5. Compare the timings of the following sorting algorithm
    a. Bubble sort
    b. Selection sort
    c. Insertion sort
6. Implement stacks using arrays for the following user defined functions
    a. Size of stack
    b. Number of elements in the stack
    c. Pop with underflow check
    d. Push with overflow check
7. Implement queues using arrays for the following user defined functions
    a. Size of queue
    b. Number of elements in the queue
    c. Insert an element with overflow check
    d. Delete an element with underflow check
8. Implement linked list for the following user defined functions
    a. Create a node and Insert an element
    b. Delete an element and its node
    c. Find the location of a given value
    d. Print the list in forward or reverse order
9. Traverse a tree and print the elements in
    a. Preorder
    b. Post order
    c. In order
10. Traverse a graph and print the elements using
    a. Depth first search
    b. Breadth first search

ECE-214N	Electronics Measurements and Instruments Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**
Course Outcomes						
CO1	**To measure the unknown inductance and capacitance using various AC bridges.**					
CO2	**To measure the unknown frequency using different frequency bridges.**					
CO3	**To understand the concept of caliberation of energy meter and B-H curve of different magnetic materials.**					
CO4	**To understand the concept conversion of voltmeter into ammeter using potentiometer.**					

List of Experiments:

1. To measure the unknown Inductance in terms of capacitance and resistance by using Maxwell's Inductance bridge.
2. To measure unknown Inductance using Hay's bridge.
3. To measure unknown capacitance of small capacitors by using Schering's bridge.
4. To measure 3-phase power with 2-Wattmeter method for balanced and unbalanced bridge.
5. To measure unknown capacitance using De-Sauty's bridge.
6. To measure unknown frequency using Wein's frequency bridge.
7. To measure unknown low resistance by Kelvin's Double bridge.
8. To test the soil resistance using Meggar (Ohm meter).
9. To calibrate Energy meter using standard Energy meter.
10. To plot the B-H curve of different magnetic materials.
11. To calibrate the Voltmeter using Crompton Potentiometer.
12. To convert the Voltmeter into Ammeter using Potentiometer.
13. Insulation testing of cables using Digital Insulation Tester.

ECE-216N	Analog Electronics Lab					
Lecture	**Tutorial**	**Practical**	**Practical**	**Sessional**	**Total**	**Time**
0	**0**	**3**	**60**	**40**	**100**	**3 Hr.**
Course Outcomes						
CO1	**To design and calculate the gain , frequency response etc of the various configuration of transistor amplifier.**					
CO2	**Describe the frequency response of and test the performance of various LC and RC oscillators.**					
CO3	**To understand and design the various applications of 555 timer such as astable and monostable multivibrator.**					

List of Experiments:

1. To Design a simple common emitter (CE) amplifier Circuit using BJT and find its gain and frequency response.

2. To Design a differential amplifier using BJT and calculate its gain and frequency response

3. To design RC coupled Single stage BJT amplifier and determination of the gain ,frequency response, input and output impedances.

4. To design a BJT Emitter follower and determination of the gain, input and output impedances .

5. To design and test the performance of BJT-RC Phase shift Oscillator for $f0 \leq 10$ KHz.

6. To design and test the performance of BJT – Hartley Oscillators for RF range $f0 \geq 100$KHz.

7. To design and test the performance of BJT – Colpitt Oscillators for RF range $f0 \geq 100$KHz.

8. To design an astable multivibrator using 555 timer.

9. To design a monostable multivibrator using 555 timer.

10. To design Schmitt trigger using op-amp and verify its operational characteristics.

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MPC-202N	Energy Studies (B.Tech All Branches Semester III/IV)					
Lecture	**Tutorial**	**Practical**	**Theory**	**Sessional**	**Total**	**Time**
3	**-**	**-**	**75**	**25**	**100**	**3**
Purpose	**To make the students conversant with the basics concepts and conversion of various form of Energy**					
Course Outcomes						
CO1	**An overview about Energy , Energy Management, Audit and tariffs**					
CO2	**Understand the Layout and working of Conventional Power Plants**					
CO3	**Understand the Layout and working of Non Conventional Power Plants**					
CO4	**To understand the role of Energy in Economic development and Energy Scenario in India**					

UNIT-I

Introduction: Types of energy, Conversion of various forms of energy, Conventional and Non-conventional sources, Need for Non-Conventional Energy based power generation.
Energy Management: General Principles of Energy Management, Energy Management Strategy.
Energy Audit & Tariffs: Need, Types, Methodology and Approach.

UNIT-II

Conventional Energy sources: Selection of site**,** working of Thermal, Hydro, Nuclear and Diesel power plants and their schematic diagrams & their comparative advantages- disadvantages.

UNIT-III

Non Conventional Energy sources: Basicprinciple, site selection and power plant layout of Solar energy, photovoltaic technologies, PV Systems and their components, power plant layout of Wind energy, layout of Bio energy plants ,Geothermal energy plants and tidal energy plants.

UNIT-IV

Energy Scenario: Lay out of power system, Role of Energy in Economic development, energy demand, availability and consumption, Commercial and Non-commercial energy, Indian energy scenario, long term energy scenario, energy pricing, energy sector reforms in India, energy strategy for the future.

Text Books:

1. Energy Studies-Wiley and Dream tech India
2. Soni, Gupta, Bhatnagar: Electrical Power Systems – DhanpatRai& Sons
3. NEDCAP: Non Conventional Energy Guide Lines
4. G.D. Roy :Non conventional energy sources
5. B H Khan :Non Conventional energy resources - McGraw Hill
6. Meinel A B and Meinal M P,Addison :Applie
7. d Solar Energy- Wesley Publications
8. George Sutton :Direct Energy Conversion - McGraw

Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)
Common for (ECE, EC, E&I)
Scheme of studies / Examination
(Semester- 3)

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P	Total	Theory	Sessional	Practical	T	
1	MATH-20IE / HUM-20IE	Mathematics-Ill / Basics of Industrial Sociology, Economics & Management.	3	1	-	4	100	50	-	150	3
2	EE-203E	Network Analysis & Synthesis	3	1	-	4	100	50	-	150	3
3	ELE-201E	Electromechanical Energy Conversion	3	1	-	4	100	50	-	150	3
4	CSE-203E	Data Structures	3	1	-	4	100	50	-	150	3
5	ECE-201E	Semiconductor Devices & Circuits	3	1	-	4	100	50	-	150	3
6	ECE-203 E	Analog Communication	3	1	-	4	100	50	-	150	3
7	ELE-203E	Electrical Machines Lab	-	-	3	3	-	50	25	75	3
8	ECE-205E	Semiconductor Devices & Circuits Lab	-	-	3	3	-	25	25	50	3
9	ECE-207E	Analog Communication Lab	-	-	2	2	-	25	25	50	3
10	CSE-211E	Data Structures Lab	-	-	3	3	-	50	25	75	3
TOTAL			18	6	11	35	600	450	100	1150	

Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)
Common for (ECE, EC, E&I)

Scheme of studies / Examination

(Semester- 4)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P	Total	Theory	Sessional	Practical	Total	
1	MATH- 201E / HUM-201E	Mathematics III / Basics of Industrial Sociology, Economics & Management.	3	1	-	4	100	50	-	150	3
2	MAT-204E	Computational Techniques	3	1	-	4	100	50	-	150	3
3	ECE-202E	Electronics Instrumentation & Measurements	3	1	-	4	100	50	-	150	3
4	ECE-204E	Digital Electronics	3	1	-	4	100	50	-	150	3
5	EE-208E	Signals & Systems	3	1	-	4	100	50	-	150	3
6	ECE-206E	Fields & Waves	3	1	-	4	100	50	-	150	3
7	ECE-208E	Electronics Measurements Lab.	-	-	3	3	-	50	50	100	3
8	ECE-210E	Digital Electronics Lab.	-	-	3	3	-	50	25	75	3
9	MAT-206E	Computational Techniques Lab.	-	-	3	3	-	50	25	75	3
		TOTAL	18	6	9	33	600	450	100	1150	-

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(5th Semester)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	ECE-301E	Antenna and Wave Propagation	3	2	-	5	100	50	-	150	3
2	ECE-303E	Computer Hardware Design	3	1	-	4	100	50	-	150	3
3	ECE-305E	Information Theory and Coding	4	1	-	5	100	50	-	150	3
4	ECE-307E	Linear IC Applications	3	2	-	5	100	50	-	150	3
5	ECE-309E	Micro-Electronics	4	1	-	5	100	50	-	150	3
6	ECE-311E	Microprocessors & Interfacing	3	2	-	5	100	50	-	150	3
7	ECE-313E	Linear Integrated Circuits(Pr)	-	-	3	3	-	50	25	75	3
8	ECE-315E	Microprocessors (Pr)	-	-	3	3	-	50	25	75	3
9	ECE-317E	Training Report	-	-	-	-	-	100	-	100	3
Total			20	9	6	35	600	500	50	1150	

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(6th Semester)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	HUT-302E	Fundamentals of Management	3	1	-	4	100	50	-	150	3
2	ECE-302E	Control System Engineering	4	1	-	5	100	50	-	150	3
3	ECE-304E	VHDL & Digital Design	3	1	-	4	100	50	-	150	3
4	ECE-306E	Digital Signal Processing	3	2	-	5	100	50	-	150	3
5	ECE-308E	Digital Communication	3	1	-	4	100	50	-	150	3
6	ECE-310E	Computer Communication Networks	3	1	-	4	100	50	-	150	3
7	ECE-312E	Digital Communication (Pr)	-	-	3	3	-	50	25	75	3
8	ECE-314E	Electronic Design (Pr)	-	-	3	3	-	50	25	75	3
9	ECE-316E	VHDL (Pr)	-	-	3	3	-	50	50	100	3
		Total	19	7	9	35	600	450	100	1150	

NOTE: Students will undergo a practical training of 6 weeks duration after the 6th Semester exam.

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(7th Semester)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	-------	Departmental Elective-I	3	1	-	4	100	50	-	150	3
2	-------	Departmental Elective-II	3	2	-	5	100	50	-	150	3
3	ECE-401E	VLSI Design	3	2	-	5	100	50	-	150	3
4	ECE-403E	Television Engineering	4	1	-	5	100	50	-	150	3
5	ECE-405E	Optical Communication	4	1	-	5	100	50	-	150	3
6	ECE-407E	Microwave Engineering	3	2	-	5	100	50	-	150	3
7	ECE-409E	Digital Signal Processing (Pr)			3	3		50	25	75	3
8	ECE-411E	Minor Project	-	-	3	3	-	75	50	125	3
10	ECE-413E	Practical Training Report	-	-	-		-	75	-	75	-
		Total	20	9	6	35	600	500	75	1175	

DEPARTMENTAL ELECTIVES-I

ECE-415E Micro-controllers
ECE-417E Bio-medical Signal Processing
ECE-419E Reliability
4. ECE-421E Nanotechnology

DEPARTMENTAL ELECTIVES-II

ECE-423E Advanced Microprocessors
ECE-425E Artificial Intelligence and Expert Systems
ECE-427E Power Electronics

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(8th Semester)

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	-	Departmental Elective-III	3	1	-	4	100	50	-	150	3
2	-	Departmental Elective-IV	3	2	-	5	100	50	-	150	3
3	ECE-402E	Wireless and Mobile Communication	3	2	-	5	100	50	-	150	3
4	ECE-404E	Radar Engineering	3	2	-	5	100	50	-	150	3
5	ECE-406E	Multimedia Communications	3	1	-	4	100	50	-	150	
6	ECE-408E	Microwave (Pr)	-	-	3	3	-	25	25	50	3
7	ECE-410E	Audio Visual Electronics (Pr)	-	-	3	3	-	25	25	50	3
8	ECE-412E	Major Project	-	-	4	4	-	75	75	150	-
9	ECE-414E	Seminar	2	-	-	2	-	25	-	25	-
10	ECE-416E	Comprehensive Viva Voce	-	-	-	-	-	75	-	75	-
11	ECE-418E	General Fitness & Professional Aptitude	-	-	-	-	-	-	75	75	-
Total			17	8	10	35	500	475	200		1175

DEPARTMENTAL ELECTIVES-III

ECE-420E Image Processing
ECE-422E Advanced Control Systems
ECE- 424E Embedded System Design

DEPARTMENTAL ELECTIVES-IV

1. ECE-426E Neuro Fuzzy Systems
2. ECE-428E Electronic Switching System
3. ECE-430E Transducers and their Applications

SYLLABUS

B-Tech 3rd Sem

BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS & MANAGEMENT

HUM – 201 E

L	T	P				
3	1	-	Sessional	:	50	Marks
			Theory	:	100	Marks
			Total	:	150	Marks
			Duration of Exam.:		3 Hrs.	

UNIT-I

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable Proportion, Laws of Return – Increasing, Constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

UNIT – III

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management – Art, Science & Profession, Fayol's Principles of Management.

Personnel Management – Meaning & Functions, Manpower – Process of Manpower Planning, Recruitment & Selection – Selection Procedure.

Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV

Marketing Management – Definition & Meaning, Scope of Marketing Management, Marketing Research – Meaning, Objectives.

Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Financial Management – Introduction, Objectives of Financial decisions, Sources of Finance.

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit. Each question will be of equal marks.

TEXT BOOKS :

"Modern Economic Theory" Dewett, K.K., S. Chand & Co.

"Economic Analysis" K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).

"Micro Economic Theory" M.L. Jhingan (Konark Publishers Pvt. Ltd.).

"Principles of Economics" M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).

"An Introduction to Sociology", D.R. Sachdeva & Vidya Bhusan.

"Society – An Introductory Analysis", R.M. Maclver Charles H. Page.

"Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

REFERENCE BOOKS

1. "Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

B-Tech 3rd Sem
MATHEMATICS - III
MATH-201 E

L	T	P				
3	1	-	Theory	:	100	Marks
			Sessional	:	50	Marks
			Total	:	150	Marks
			Duration of Exam		: 3 Hrs.	

UNIT – I

Fourier Series : Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions : Probability, Baye's theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

Higher Engg. Mathematics : B.S. Grewal
Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchil; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha
4. Probability and statistics for Engineer : Johnson. PHI.

Note : Examiner will set eight questions, taking two from each unit. Students will be required to attempt five questions in all taking at least one from each unit. Each question will be of equal marks.

B-Tech 3rd Sem
NETWORK ANALYSIS & SYNTHESIS
EE-203-E

L T P				
3 1 0	Sessional	:	50	Marks
	Exam	:	100	Marks
	Total	:	150	Marks
	Duration Of Exam	:	3 Hrs	

UNIT I

TOPOLOGY :

Principles of network topology, graph matrices, network analysis using graph theory.

TRANSIENT RESPONSE :

Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using laplace transform.

UNIT 2

NETWORK FUNCTIONS :

Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

UNIT 3

CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS :

Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4

TYPES OF FILTERS AND THEIR CHARACTERISTICS :

Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

NETWORK SYNTHESIS :

Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:

1. Network Analysis & Synthesis : Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis : F.F.Kuo; John Wiley & Sons Inc.

REFERENCE BOOKS:

1. Introduction to modern Network Synthesis : Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis : G.K. Mithal; Khanna Publication.
6. Networks and Systems : D.Roy Choudhury; New Age International.

NOTE : Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.

B-Tech 3rd Sem

ELECTROMECHANCIAL ENERGY CONVERSION

ELE : 201 E

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Total	:	150
			Duration of Exam		: 3 Hrs.

UNIT – I

MAGNETIC CIRCUITS AND INDUCTION

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses, frictional & copper losses.

TRANSFORMERS :

Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer; Scott connection, parallel operation of transformer.

UNIT – II

PRINCIPLES OF ELECTROMECHANCIAL ENERGY CONVERSIONS

Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques is system with permanent magnets, dynamic equation.

DC MACHINES

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, Types of DC generator & motors Armature reaction, communication, characteristics of DC machines.

UNIT – III

INDUCTION MOTOR

Basic theory, construction, Phasor diagram, advantage of IM over other conventional machines Equivalent circuit, Torque equation, Load characteristics, starting speed control of induction motor, Introduction to single phase Induction motor double field revolving theory, types of single phase IM and its applications, open circuit & block rotor test.

UNIT-IV

SYNCHRONOUS MACHINES

Construction and basic theory of synchronous generator, emf equation, advantages of stationary armature, Regulation, Basic theory of synchronous motor, v-curves, starting of synchronous motor, comparison between synchronous & induction, open circuit & block rotor teat of 3 phase and 1 phase motor.

Text Book :

Electrical Machines : P.S. Bimbhra; Khanna

Reference :

Electrical Machines : Nagarath and Kothari; TMH
Electrical Machines : Mukherjee and Chakravorti; Dhanpat Rai & Sons.
Electrical Technology (Vol-II) : B.L. Theraja; S. Chand.

NOTE : Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IIIRD SEMESTER
DATA STRUCTURES
CSE-203 E

L	T	P				
3	1	-	THEORY	:	100	Marks
			SESSIONAL	:	50	Marks
			TOTAL	:	150	Marks
			TIME	:	3 Hrs.	

Unit-1: Introduction : Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it.

Arrays: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.

Unit-2: Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues & Applications.

Linked Lists : Need of dynamic data structures, continuous & linked implementation of lists. Operations on lists. Dynamic implementation of linked lists, Operations. Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists : continuos & dynamic implementation, operations.

Unit-3: Trees : Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes. Binary tree traversals : preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using trees. Representation of lists as binary trees.

Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search trees,

Unit- 4 : Graphs :Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs,. Graph traversals and spanning forests, minimum-spanning trees, computer representation of graphs.

Tables : Definition, Hash Functions, Implementation & Applications.

Sorting & Searching : Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

Text Book:

Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:

- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H

Note: Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES AND CIRCUITS
(ECE-201E)

L	T	P				
3	1	-	THEORY	:	100	Marks
			SESSIONAL	:	50	Marks
			TOTAL	:	150	Marks
			TIME	:	3 Hrs.	

UNIT-I

P-N JUNCTION DIODE**: -** P-N junction and its V-I characteristics, P-N junction as rectifier, diode as a circuit element, the load line concept, half-wave and full-wave rectifiers, filter circuits. Photoelectric devices & their applications.

REGULATED POWER SUPPLIES: - Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

UNIT-II

TRANSISTORS: - Review of BJT and its Hybrid model, analysis of a transistor amplifier circuit using h-parameters, Emitter follower, Miller's theorem, Frequency response of R-C coupled amplifier, Multistage amplifier, classification of amplifiers, Transistor Biasing; Operating point, Bias stability, Collector to Base bias, Self-bias, emitter bias, bias compensation, Thermistor and sensitor compensation, High frequency limitations on BJT'S

UNIT-III

FEEDBACK OSCILLATORS AND POWER AMPLIFIERS: - Feedback in amplifiers: Basic feedback topologies. Oscillators: Barkhausen's criterion, sinusoidal oscillators, Phase shift oscillators, Resonant circuit oscillator, a general form of oscillator, the Wein Bridge oscillator, Crystal oscillator. Introduction to power amplifiers and its various types with applications.

UNIT-IV

FIELD EFFECT TRANSISTORS: - JFET, pinch-off voltage, Volt-ampere characteristics, small signal model, MOSFET-Enhancement & Depletion mode, V-MOSFET, JFET & MOSFET amplifiers, Biasing of JFETS and MOSFETS.

TEXT BOOKS:

Integrated Electronics: Millman & Halkias; Mc Graw Hill.

Electronic circuit analysis and design (Second Edition): D.A. Neamen; TMH

REFERENCE BOOKS:

Electronics Principles: Malvino; Mc Graw Hill.

Electronics circuits: Donald L. Schilling & Charles Belove: Mc Graw Hill.

Electronics Devices & Circuits: Boylestad & Nashelsky; Pearson Education.

NOTE

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION
(ECE-203E)

L	T	P			
3	1	-	THEORY	: 100	Marks
			SESSIONAL	: 50	Marks
			TOTAL	: 150	Marks
			TIME	: 3 Hrs.	

UNIT – I

NOISE: Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

UNIT-II

MODULATION TECHNIQUES: Basic constituents of Communication Systems, need of modulation, Amplitude modulation, spectrum of AM wave, modulation index, DSBSC modulation, SSB Modulation, Collector modulation, Square law modulation methods, Methods of generating SSB Signals, vestigial side band modulation, Detection of AM Signal; Diode detector, Square Law Detector. Time Constant RC in diode detector. Diode detector with filter. FDM, Power relations in AM wave.

UNIT-III

ANGLE MODULATION: frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT-IV

TRANSMITER AND RECEIVER: Classification of radio transmitters, Block diagram of AM transmitter, Frequency Scintillation, Frequency drift, Radio broadcast transmitter, Radio telephone transmitter, Privacy devices, Armstrong FM transmitter, Simple FM transmitter using Reactance modulator.

Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

REFERENCE BOOKS:

Taub & Schilling, Principles of Communication Systems, TMH.
Mithal G K, Radio Engineering, Khanna Pub.
Simon Haykin, Communication Systems, John Wiley.
Dungan F.R., Electronics Communication System, Thomson-Delmar
Electronics Communication System: Kennedy; TMH

NOTE:

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B-Tech 3rd Sem
ELECTRICAL MACHINES LAB
ELE – 203E

L	T	P			
0	0	3	Practical	:	25
			Sessional	:	50
			Total	:	75
			Duration of Exam : 3 Hrs.		

LIST OF EXPERIMENTS

To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.

To perform Sumpner's back to back test on-phase transformer.

Parallel operation of two 1-phase transformers.

Study of construction of a DC machine.

To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.

Speed Control of a DC motor by armature control & field control methods.

Open circuit & Block test of 1-phase induction motor.

Light running & block rotor test of 3-phase I.M. with starting.

To plot V curve of a synchronous motor.

To study scott connection of transformer.

To study starting running & reversal of direction of 3-phase I.M.

To perform load test on a 3-phase I.M. D.C. generator set & to determine the efficiency of I.M.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES & CIRCUITS LAB
(ECE-205E)

L	T	P
-	-	3

Sessional	:	25	Marks
Viva	:	25	Marks
Total	:	50	Marks
Time	:	3hrs.	

LIST OF EXPERIMENTS: -

1. Measurement & study of P-N junction diode-I-V and C-V characteristics.
2. Study of Half-wave and Full-wave rectifier.
3. Measurement and study of solar cell –I-V characteristics.
4. Study of Active filters.
5. Study of diode as Clipper and Clamper.
6. Study of Zener diode as Voltage Regulator.
7. Measurement and study of Input and Output characteristics of a BJT.
8. Study of CE amplifier-Current & Power gains and Input, Output Impedances.
9. To study the frequency response of RC coupled amplifier.
10. Measurement and study of Output characteristics of JFET.
11. Measurement and study of Output characteristics of MOSFET.
12. Study of SCR/Thyristor characteristics.
13. Study of UJT characteristics.
14. Study of Push-Pull amplifier.

NOTE:
At least ten experiments are to be performed from above list.

B.TECH IIIRD SEMESTER
ANALOG COMMUNICATION LAB
(ECE-207E)

L	T	P
-	-	2

Sessional	:	25	Marks
Viva	:	25	Marks
Total	:	50	Marks
Time	:	3hrs.	

LIST OF EXPERIMENTS:

1. i) To study Double Sideband Amplitude Modulation and determine its modulation factor and power in sidebands.
   ii) To study amplitude demodulation by linear diode detector.
2. i) To study Frequency Modulation and determine its modulation factor.
   ii) To study PLL 565 as frequency demodulator
3. To study Sampling and reconstruction of pulse amplitude modulation system.
4. To study the Sensitivity characteristics of superhetrodyne receiver.
5. To study the Selectivity characteristics of superhetrodyne receiver.
6. To study the Fidelity characteristics of superhetrodyne receiver.
7. i) To study Pulse Amplitude Modulation
   a) Using switching method
   b) By sample and hold circuit.
   ii) To demodulate the obtained PAM signal by IInd order Low pass filter.
8. To study Pulse Width Modulation / Demodulation.
9. To study Pulse Position Modulation / Demodulation.
10. To study active filters (Low-pass, High-pass, Band-pass, Notch filter).

NOTE:
At least seven experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining three.

B.TECH IIIRD SEMESTER
DATA STRUCTURES LAB
(CSE-211E)

L	T	P				
-	-	3	Sessional	:	50	Marks
			Exam	:	25	Marks
			Total	:	75	Marks
			Duration of Exam: 3 Hrs.			

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3.. Write a program to perform following operations on tables using functions only
   a) Addition b) Subtraction c) Multiplication d) Transpose
4.. Write a program to implement Queue.
5. Write a program to implement Stack.
6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
7. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
8. Write a program to implement binary search tree.
   (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
10 . Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operations on it
    a) add a node b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.

Write a program which simulates the various tree traversal algorithms.
Write a program to implement various Searching Techniques.
Write a program to implement Sorting Techniques.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

B.TECH IVTH SEMESTER
COMPUTATIONAL TECHNIQUES
(MAT-204E)

L	T	P			
3	1	-	THEORY	: 100	Marks
			SESSIONAL	: 50	Marks
			TOTAL	: 150	Marks
			TIME	: 3Hrs.	

PART – A

1. Matrix Inversion: -

Gauss Elimination Method, Gauss Jordan Method, Crout's Method, Doolittle Method, Choleski's Method, Improvement in the accuracy of an inverse, The Escalator Method for Matrix Inversion, Inverse of a complex matrix.

2. Operational Research: -

Linear Programming Problems formulation, Solving linear programming problems using Graphical Method, Simplex Method, Dual Simplex Method.

PART –B

Numerical Methods with Programming in Language 'C'

3. Numerical Solution of Algebraic & Transcendental equation: -

Bisection Method, Regula Falsi Method, Newton Raphson Method, Secant Method, Convergence of Secant Method, Rate of Convergence of Newton's Method & Condition of Convergence of Newton Raphson's Method.

4. Solution of Simultaneous Equations: -

Crout's Triangularisation Method, Jacobi's Iteration Method, Gauss Seidal Iteration Method, Relaxation Method, Newton's Method for Non Linear System of equation & Iterative Methods.

5. Numerical Solution of Ordinary Differential Equation: -

Picard's Method, Euler's Method, Modified Euler Method, Euler's improved Method, Runge-Kutte Method, Milne's & Adams-Bashforth Predictor-Corrector Method.

PART – C

6. Finite Differences: -

Difference Operators, Newton Forward & Backward Interpolation formula, Gauss central difference formulae, Bessel & Stirling formulae, Lagrange's & Newton Divided Difference, Interpolation formula for unequal intervals, Numerical Differentiation**,**

Numerical I**ntegration** – Trapezoidal rule, Simpson's $1/3^{rd}$ Rule & $3/8^{th}$ rule, Weddle's Rule.

7. Difference Equations: -

Formation of Difference Equation, Solution of Linear Difference Equations.

NOTE:

Question paper is to be set in three parts taking at least two questions from each part of the syllabus. There will be a total of eight questions in all. Students will be required to attempt five questions selecting at least one question from each part. Each question will be of equal marks.

Books Recommended: -

1. Numerical Methods for Scientific & Engineering Computation by M K. Jain, R.K. Jain, S.R.K. Iyengar, New Age Publications.
2. Numerical Analysis By Goel & Mittal, Pragati Prakashan.
3. Higher Engg. Mathematics by B. S. Grewal.
4. Mathematical Analysis in Engg. By Cang C. Mai
5. Numerical Mathematical Analysis by James B. Scarborough.

B.TECH IVTH SEMESTER
ELECTRONICS INSTRUMENTATION AND MEASUREMENTS
(ECE-202E)

L	T	P
3	1	-

THEORY	: 100 Marks
SESSIONAL	: 50
TOTAL	: 150
TIME	: 3Hrs.

UNIT-I:

MEASUREMENT AND ERROR: Functional elements arid generalized configuration of a measuring Instrument, Characteristics of instruments, errors in measurements and their statistical analysis.

MEASUREMENT OF RESISTANCE: Wheat stone bridge, Carey-Foster Bridge, Kelvin double bridge, Measurement of Insulation resistance.

UNIT-II:

A-C BRIDGES: Maxwell Inductance bridge. Maxwell Inductance Capacitance Bridge, Anderson's Bridge, Hay's Bridge, De-Sauty's Bridge, Schering's bridge and Wein's bridge.

VOLTAGE INDICATING AND RECORDING DEVICES: Analog voltmeters and Potentiometers, Self balancing potentiometer and X-Y recorders, Galvanometers - Oscillographs, Cathode - Ray Oscilloscopes, Magnetic Tape Recorders.

UNIT-III:

ELECTRONIC INSTRUMENTS: Wave analyzer, Distortion meter: Q-meter. Measurement of Op-Amp parameters.

DIGITAL INSTRUMENTS: Digital Indicating Instruments, Comparison with analog type, digital display methods, digital methods of time and frequency measurements, digital voltmeters.

UNIT-IV:

TRANSDUCERS: Classification of Transducers, Strain Gauge, Displacement Transducers - Capacitive Transducers, LVDT, Piezo-electric Transducers, Temperature Transducers - resistance thermometer, Thermocouples and Thermistors, Liquid level measurement Low pressure (vacuum) measurement.

DATA ACQUISITION SYSTEMS: A to D and D to A converters, Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry.

TEXT BOOK:

A Course in Electrical and Electronics Measurements and Instrumentation: A.K. Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS:

Electronics Instrumentation and Measurement Techniques: Cooper W.D & Helfrick A.D.; PHI
Doeblin E.O., Measurement Systems: Application & Design, Mc Graw Hill.

NOTE:

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS
(ECE-204E)

L	T	P			
3	1	-	THEORY	: 100	Marks
			SESSIONAL	: 50	Marks
			TOTAL	: 150	Marks
			TIME	: 3 HR	

UNIT 1

FUNDAMENTALS OF DIGITAL TECHNIQUES:
Digital signal, logic gates: AND. OR, NOT. NAND. NOR- EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3. Gray codes.

COMBINATIONAL DESIGN USING GATES:
Design using gates. Karnaugh map and Quine Mcluskey methods of simplification.

UNIT 2

COMBINATIONAL DESIGN USING MST DEVICES
Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtracters. BCD arithmetic Circuits. Encoders. Decoders / Drivers for display devices.

SEQUENTIAL CIRCUITS:
Flip Flops: S-R- J-K. T. D, master-slave, edge triggered- shift registers, sequence generators. Counters. Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

UNIT 3

DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS-devices. Bipolar logic families: RTL, DTL, DCTL. HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic. Interfacing of CMOS and TTL families.

UNIT 4

A/D AND D/A CONVERTERS:
Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation, counting type.
Dual-slope ADC, specifications of ADCs.

PROGRAMMABLE LOGIC DEVICES:
ROM, PLA. PAL, Introduction to FPGA and CPLDs.

TEXT BOOK:
1. Modem Digital Electronics (Edition III): R. P. Jain; TMH

REFERENCE BOOKS:
1. Digital Integrated Electronics: Taub & Schilling: MGH
2. Digital Principles and Applications: Malvino & Leach: McGraw Hill.
3. Digital Design: Morris Mano: PHI,

NOTE: Eight questions are to be set in all by the examiner taking at least two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IVTH SEMESTER

SIGNAL AND SYSTEMS.
EE-208-E

L	**T**	
3	1	Theory: 100 Marks Sessional : 50 Marks Total : 150 Marks Time: 3 Hrs.

UNIT-I

SIGNAL

Types of signals:- Deterministic and Stochastic, periodic and a periodic, impulse functional sequences, analog and discrete, singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation. Fourier series, Fourier and La-place transforms. Convolution theorem, geometrical interpretation and application.

UNIT-II

Probability concepts, random variable, pdf, cdf, moments, distributions, correlation functions. Characterization of stochastic signals.

Discretisation of analog signals – sampling, sampling theorem and its proof. Effect of under sampling, recovery of analog signals from sampled signal. Characterization of Discrete signals – in terms of impulse sequences, Z-transforms. Properties, inversion and applications of La-place, Fourier and Z-transforms.

UNIT-III

SYSTEM

Classification linear and non-linear, time invariant and time varying, Lumped and distributed. Deterministic and Stochastic. Casual and non causal, Analog and Discrete/Digital memory and memory less, 1 port and N – port, SISO, SIMO, MISO, MIMO.

UNIT-IV

System modeling in terms of differential, equations, state variables, difference equations and transfer functions. Linear time invariant system properties, elementary idea of response determination to deterministic and stochastic signals. Concept of impulse response.

REF. BOOKS :

Fred J Taylor –"Principles of Signals and System", MGH.

Simon Haykins – "Signal & Systems", Wiley Eastern

A Papoulis – "Circuit and System" Modern Approach HRW

NOTE: Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.

B.TECH IVTH SEMESTER
FIELDS & WAVES
(ECE-206E)

L	T	P
3	1	-

THEORY : 100 Marks
SESSIONAL: 50 Marks
TOTAL : 150 Marks
TIME : 3 Hrs.

UNIT-1

ELECTRIC FIELD AND CURRENT

Coulomb's law. Electric field intensity, field due to a continuous volume charge distribution, field of a line charge, field of a sheet of charge, electric flux density, Gauss's law and applications, electric potential, the dipole, current density, continuity of current, metallic conductors, conductor properties and boundary conditions, the method of images, the nature of dielectric materials, boundary conditions for perfect dielectric materials, capacitance of two wire line, Poisson's and Laplace's equations, uniqueness theorem.

UNIT-II

MAGNETIC FIELD AND MAXWELLI EQUATION

Biot - Savart law. Ampere's law, magnetic vector potentials, force on a moving charge, differential current element, force and torque on a closed circuit, the boundary conditions, the magnetic circuit, potential energy and forces on magnetic materials.

Faraday's law, Maxwell's equations in point form and integral form Maxwell's equations for sinusoidal variations, retarded potentials.

UNIT-III

THE UNIFORM PLANE WAVE

Wave motion in free space and perfect dielectrics, plane waves in lossy dielectrics. The Poynting vector and power considerations, propagation in good conductors, skin effect, reflection of uniform plane waves, SWR.

UNIT-IV

TRANSMISSION LINES AND WAVEGUIDES

The Transmission line equations, graphical methods, Smith chart, time-domain and frequency-domain analysis. TE, TM, TEM waves, TE and TM modes in rectangular and circular waveguides, cut-off and guide wavelength, wave impedance and characteristic impedance, dominant modes, power flow in waveguides, excitation of waveguides, dielectric waveguides.

REFERENCES:

1 Jordan E C & Balmain K G, Electromagnetic Waves and Radiating Systems, PHI.
2 David K. Chang, Field and Waves Electromagnetics, Addison Wesley.
3 Hayt W H JR., Engineering Electromagnetics, Tata McGraw Hill, Fifth edition.

NOTE:

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all selecting at least one question from each unit. Each question will be of equal marks.

B.TECH IVTH SEMESTER
ELECTRONICS MEASUREMENTS LAB
(ECE-208E)

L	T	P
-	-	3

Sessional	: 50	Marks
Practical	: 50	Marks
Total	: 100	Marks
Time	: 3hrs.	

LIST OF EXPERIMENTS:

To measure the unknown Inductance in terms of capacitance and resistance by using Maxwell's Inductance bridge.
To measure unknown Inductance using Hay's bridge.
To measure unknown capacitance of small capacitors by using Schering's bridge.
To measure 3-phase power with 2-Wattmeter method for balanced and unbalanced bridge.
To measure unknown capacitance using De-Sauty's bridge.
To measure unknown frequency using Wein's frequency bridge.
To measure unknown low resistance by Kelvin's Double bridge.
To test the soil resistance using Meggar (Ohm meter).
To calibrate Energy meter using standard Energy meter.
To plot the B-H curve of different magnetic materials.
To calibrate the Voltmeter using Crompton Potentiometer.
To convert the Voltmeter into Ammeter using Potentiometer.
Insulation testing of cables using Digital Insulation Tester.

NOTE:

At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two

B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS LAB
(ECE-210E)

L	T	P
-	-	3

Sessional	: 50	Marks
Practical	: 25	Marks
Total	: 75	Marks
Time	: 3 hrs.	

LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and Demultiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of asynchronous Up/down counter using J-K FFs.
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
12. Study of Encoder and Decoder.
13. Study of BCD to 7 segment Decoder.

NOTE:

At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.

B.TECH IVTH SEMESTER
COMPUTATIONAL TECHNIQUES LAB
(MAT-206E)

L	T	P
-	-	3

Sessional	: 50	Marks
Viva	: 25	Marks
Total	: 75	Marks
Time	: 3hrs.	

List of Experiments

The Source codes for the following problems are to develop by the students & results should be verified.

1. Solution of Non-Linear Equation in single variable using the method of successive Bisection.
2. Solution to non-linear equation in single variable using the Newton-Raphons method.
3. Solution to non linear equation in single variable using the Secant method.
4. Solution to a system of simultaneous algebraic equations using the Gaussian elimination procedure.
5. Solution to a system of simultaneous algebraic equations using the Gauss-Seidel iterative method.
6. Numerical solution to an ordinary differential equation using the Eulers method.
7. Numerical solution to an ordinary differential equation using the Runge-Kutta Method.
8. Numerical solution to an ordinary differential equation using the Predictor Corrector Method.
9. Numerical Solution to the Laplace equation using the method of finite differences.
10. Solution to system of simultaneous equations using Gauss-Seidal iterative method employing the technique of successive relaxation.

NOTE:

At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.

B.TECH Vth SEMESTER
ANTENNA AND WAVE PROPAGATION
(ECE-301E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I

BASIC PRINCIPLES AND DEFINITIONS: Retarded vector and scalar potentials. Radiation and induction fields. Radiation from elementary dipole (Hertzian dipole, short dipole, Linear current distribution), half wave dipole, Antenna parameters : Radiation resistance, Radiation pattern, Beam width, Gain, Directivity, Effective height, Effective aperture, Bandwidth and Antenna Temperature.

UNIT – II

RADIATING WIRE STRUCTURES AND ANTENNA ARRAYS: Folded dipole , Monopole, Biconical Antenna, Loop Antenna, Helical Antenna. Principle of pattern multiplication, Broadside arrays, Endfire arrays, Array pattern synthesis, Uniform Array, Binomial Array, Chebyshev Array, Antennas for receiving and transmitting TV Signals e.g. Yagi-Uda and Turnstile Antennas.

UNIT – III

APERTURE TYPE ANTENNAS: Radiation from rectangular aperture, E-plane Horns, H-plane Horns, Pyramidal Horn, Lens Antenna, Reflector Antennas .

BROADBAND AND FREQUENCY INDEPENDENT ANTENNAS : Broadband Antennas. The frequency independent concept : Rumsey's principle, Frequency independent planar log spiral antenna, Frequency independent conical spiral antenna and Log periodic antenna.

UNIT – IV

PROPAGATION OF RADIO WAVES : Different modes of propagation, Ground waves, Space waves, Surface waves and Tropospheric waves, Ionosphere, Wave propagation in the ionosphere, critical frequency, Maximum Usable Frequency (MUF), Skip distance, Virtual height, Radio noise of terrestrial and extra terrestrial origin. Multipath fading of radio waves.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.Each question will be of equal marks.

Suggested Books:

Robert E.Collin, Antenna & Wave Propagation, McGraw Hill
John D. Kraus, Antennas, McGraw Hill.
E.C.Jordan and K.G.Balmain, Electromagnetic Waves and Radiating Systems, PHI

B.TECH Vth SEMESTER
COMPUTER HARDWARE DESIGN
(ECE-303E)

L	T	P				
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

BASIC STRUCTURE OF COMPUTER HARDWARE AND SOFTWARE :
Functional Units, historical Perspective, Register transfer and micro-operations. Information representation, Instruction format, Instruction types, Addressing modes, Machine and Assembly Language programming, Macros and Subroutines.

UNIT-II

PROCESSOR DESIGN: Fixed – point and floating-point arithmetic addition, subtraction, Multiplication and division, Decimal arithmetic unit – BCD adder, BCD subtraction, decimal arithmetic operations, ALU design, Forms of Parallel processing classification of Parallel structures, Array Processors, Structure of general purpose Multiprocessors.
CONTROL DESIGN:
Hardwired Control: design methods, Multiplier Control Unit, CPU Control unit, Microprogrammed Control: basic concepts, Multiplier Control Unit, Microprogrammed Computers, CPU Control unit.

UNIT-III

MEMORY ORGANIZATION: Memory device characteristics, Random access memories: semiconductor RAMS, Serial – access Memories – Memory organization, Magnetic disk memories, Magnetic tape memories, Optical memories, Virtual memory, Main Memory Allocation, Interleaved memory, Cache Memory, Associative Memory.

UNIT-IV

SYSTEM ORGANIZATION: Input-Output Systems – Programmed IO, DMA and Interrupts, IO Processors, Interconnection networks – single bus, crossbar networks, multistage networks, hypercube networks, mesh networks, Tree networks, ring networks, Pipelining – basic concept.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

J.P.Hayes, Computer Architecture and Organization, Mc Graw Hill.
M.M. Mano , Computer System Architecture, PHI.
V.C.Hamacher, Z.G.Vianesic & S.G.Zaky, Computer Organization , Mc-Graw Hill.

B.TECH Vth SEMESTER
INFORMATION THEORY AND CODING
(ECE-305E)

L	T	P			
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3 hrs.

UNIT – I

PROBABILITY AND RANDOM PROCESSES : Probability, random variables, Probability distribution and density functions, Joint Statistics, Conditional Statistics, independence, Functions of random variables & random vectors, Expectation, moments, Characteristic Functions, Convergence of a sequence of random variables, Central Limit Theorem, Random Processes, mean and Auto Correlation, Stationary ergodicity, Power Spectral density, Response of memory-less and linear systems, Gaussian Poisson, Markov processes.

UNIT – II

ELEMENTS OF INFORMATION THEORY AND SOURCE CODING: Introduction, information as a measure of uncertainty, Entropy, its properties, Discrete memoryless channels, Mutual information, its properties, BSC, BEC. Channel capacity, Shanon's theorem on coding for memoryless noisy channels.

Separable binary codes, Shanon–Fano encoding, Noiseless coding, Theorem of decodability, Average length of encoded message, Shanon's binary encoding, Fundamental theorem of discrete noiseless coding, Huffman's minimum redundancy codes.

UNIT – III

LINEAR BLOCK CODES: Introduction to error control coding, Types of codes, Maximum Likelihood decoding, Types of errors and error control strategies, Galois fields, Linear block codes, Error detecting and correcting capabilities of a block code, Hamming code, cyclic code, B.C.H. codes.

UNIT – IV

CONVOLUTIONAL CODES AND ARQ: Transfer function of a convolutional code, Syndrom decoding, Majority logic decodable codes, Viterbi decoding, distance properties of binary convolutional codes, Burst error correcting convolutional codes, general description of basic ARQ strategies, Hybrid ARQ schemes.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Papoulis, A. Probability, Random Variables and Stochastic Processes, MGH.
Gray, R.M. Davission,L.D,Introduction to Statistical Signal Processing-
Web Edition-1999.
F. M. Reza, Information Theory, McGraw Hill.
Das, Mullick and Chatterjee, Digital Communication, Wiley Eastern Ltd.
Shu Lin and J. Costello, Error Control Coding, Prentice Hall.
B. R. Bhat, Modern Probability Theory, New Age International Ltd.

B.TECH Vth SEMESTER
LINEAR IC APPLICATIONS
(ECE-307E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I
DIFFERENTIAL AND CASCADE AMPLIFIERS: Balanced, unbalanced output differential amplifiers, FET differential amplifier, current mirrors, level Translators, cascade configuration of amplifiers, operational amplifiers, Introduction to ideal OP-AMP, characteristic parameters, Practical OP-AMP, its equivalent circuit and op-amp circuit configurations.

UNIT-II
OP-AMP WITH NEGATIVE FEEDBACK AND FREQUENCY RESPONSE: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback differential amplifiers, frequency response compensating network, frequency response of internally compensative op-amp and non compensating op-amp. High frequency op-amp equivalent circuit, open loop gain V/s frequency, closed loop frequency response, circuit stability, slew rate.

UNIT-III
OP-AMP APPLICATION: DC, AC amplifiers, peaking amplifier, summing, scaling, averaging and instrumentation amplifier, differential input output amplifier, voltage to current converter, current to voltage converter, very high input impedance circuit, integration and differential circuit, wave shaping circuit, active filters, oscillators

UNIT-IV
SPECIALIZED LINER IC APPLICATIONS: 555 timer IC (monostable & astable operation) & its applications , Universal active filter, PLL, power amplifier, 8038 IC.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

R.A. Gayakwaed , OP-amps and Linear Integrated circuits .
K.R.Botkar , Integrated circuits.

B.TECH Vth SEMESTER
MICRO-ELECTRONICS
(ECE-309E)

L	T	P				
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I:
Crystal Growth: MGS, EGS, Czochralspi crystal Puller, Silicon shaping, Wafer Preparation. Oxidation: Thermal Oxidation Kinetics, Oxidation Techniques, Oxide Properties, Oxidation induced defects. Thin film deposition techniques: Epitaxy, VDE, CVD, PECVD, MOCVD, PVD, Sputtering , MBE and epitaxial layer evaluations.

UNIT-II:
LithoGraphy, Photolithography, E-beam lithography, X-ray Lithography, reactive Plasma Etching, Plasma Properties, Feature Size control and anisotropic etching, Plasma etching techniques and equipment.

UNIT-III:
Diffusion : A Qualitative view of atomic diffusion in Solids, diffusion mechanisms, Fick's one dimensional diffusion equation, constant source and limited source diffusion, Diffusion of Grp3 and 5 impurities in Silicon Impurity Sources, diffusion apparatus, Characterization of diffused layers. Ion Implantation: Introduction, Range Theory, Implantation Equipment Annealing.

UNIT-IV:
Isolation Techniques, Bipolar IC fabrication Process Sequence, N-MOS IC fabrication Process Sequence.C-MOS IC fabrication Process Sequence .Assembly & Packaging: Package Types, design considerations, Package fabrication technologies, Future trends reference to MEMS packaging.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

S.M.Sze, VLSI Technology, Mc Graw Hill.
S.K.Ghandhi, VLSI Fabrication Principles.

B.TECH Vth SEMESTER
MICROPROCESSORS & INTERFACING
(ECE-311E)

L	T	P			
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I:
INTRODUCTION : Evolution of microprocessors, technological trends in microprocessor development. The Intel family tree. CISC Versus RISC. Applications of Microprocessors.
8086 CPU ARCHITECTURE : 8086 Block diagram; description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU. 8086 Pin diagram descriptions. Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module.

UNIT-II:
8086 INSTRUCTION SET : Instruction formats, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions; Assembler directives.
8086 PROGRAMMING TECHNIQUES : Writing assembly Language programs for logical processing, arithmetic processing, timing delays; loops, data conversions. Writing procedures; Data tables, modular programming. Macros.

UNIT-III:
MAIN MEMORY SYSTEM DESIGN : Memory devices, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode. Address decoding techniques. Interfacing SRAMS; ROMS/PROMS. Interfacing and refreshing DRAMS. DRAM Controller – TMS4500.

UNIT-IV:
BASIC I/O INTERFACE : Parallel and Serial I/O Port design and address decoding. Memory mapped I/O Vs Isolated I/O Intel's 8255 and 8251- description and interfacing with 8086. ADCs and DACs, - types, operation and interfacing with 8086. Interfacing Keyboards, alphanumeric displays, multiplexed displays, and high power devices with 8086.
INTERRRUPTS AND DMA : Interrupt driven I/O. 8086 Interrupt mechanism; interrupt types and interrupt vector table. Intel's 8259. DMA operation. Intel's 8237. Microcomputer video displays.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
1. D.V.Hall , Microprocessors and Interfacing , McGraw Hill 2nd ed.
2. J Uffenbeck , The 8086/8088 family , (PHI).
3. Liu,Gibson , Microcomputer Systems – The 8086/8088 family, (2nd Ed-PHI).

B.TECH Vth SEMESTER
LINEAR INTEGRATED CIRCUITS (Pr.)
(ECE-313E)

L	T	P			
-	-	3	Exam	:	25
			Sessional	:	50
			Time	:	3Hrs

To study OP-AMP as adder and subtractor circuits(IC-741).
To study clipping circuits using OP-AMP(IC-741).
To study clamping circuits using OP-AMP(IC-741).
To study OP-AMP as Schmitt trigger(IC-741).
To study an instrumentation amplifier using OP-AMP(IC-741).
Study of current to voltage and voltage to current convertor using OP-AMP(IC-741).
To study Astable multivibrator circuit using timer IC-555.
To study monostable multivibrator circuit using timer IC-555.
To study Voltage Controlled Oscillator using timer IC-555.
To study Frequency divider using IC-555.
To design 2nd order low pass butterworth filter.
To design 2nd order high pass butterworth filter.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH Vth SEMESTER
MICROPROCESSORS (Pr.)
(ECE-315E)

L	T	P			
-	-	3	Exam	:	25
			Sessional	:	50
			Time	:	3Hrs

Before starting with the experiments, teacher should make the students conversant with the following essential theoretical concepts.

A. i) Programming Model of Intel's 8086.
ii) Addressing Modes of Intel's 8086.
iii) Instruction formats of Intel's 8086

Instruction set of Intel's 8086.
Assembler , and Debugger.

LIST OF EXPERIMENTS:

I a) Familiarization with 8086 Trainer Kit.
b) Familiarization with Digital I/O, ADC and DAC Cards.
c) Familiarization with Turbo Assembler and Debugger S/Ws.

II Write a program to arrange block of data in
i) ascending and (ii) descending order.

III Write a program to find out any power of a number such that $Z = X^N$.
Where N is programmable and X is unsigned number.

IV Write a program to generate.
i) Sine Waveform (ii) Ramp Waveform (iii) Triangular Waveform Using DAC Card.

V Write a program to measure frequency/Time period of the following functions.
(i) Sine Waveform (ii) Square Waveform (iii) Triangular Waveform using ADC Card.

VI Write a program to increase, decrease the speed of a stepper motor and reverse its direction of rotation using stepper motor controller card.

VII write a programmable delay routine to cause a minimum delay = 2MS and a maximum delay = 20 minutes in the increments of 2 MS

VIII a) Use DOS interrupt to read keyboard string/character.
b) Use BIOS interrupt to send a string/character to printer.

IX Write a program to :
Create disk file.
Open, write to and close- a disk file.
Open, read from and close a disk file.
Reading data stamp of a file using BIOS interrupt.

X i) Erasing UVPROMs and EEPROMs
Reprogramming PROMs using computer compatible EPROM Programmer.

XI Studying and Using 8086 In-Circuit Emulator.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of syllabus.

B.Tech. (Common for all branches 5th/6th Semesters)
FUNDAMENTALS OF MANAGEMENT
HUT-302E

L	T
3	1

Theory : 100 Marks
Sessionals : 50 Marks
Total : 150 Marks
Time : 3 hours

UNIT-I **Financial Management**

Introduction of Financial Management, Objectives of Financial Decisions, Status and duties of Financial Executives. Financial Planning – Tools of financial planning. Management of working capital, Factors affecting requirements of working capital. Capital structure decisions. Features of appropriate capital structure. Sources of finance.

UNIT-II **Personnel Management**

Personnel Management – Meaning, Nature and Importance; Functions of Personnel Management – (a) Managerial Functions and (b) Operative functions. Job Analysis: Meaning and Importance; Process of Job Analysis; Job Description and Job specification. Human Resource Development-Meaning and concept.

UNIT-III **Production Management**

Production Management : Definition and Objectives
Plant location: Ideal plant location. Factors affecting plant location.
Plant Layout : Ideal plant layout, factors affecting plant layout.
Work Measurement : Meaning, Objectives and Essentials of work Measurement.
Production Control : Meaning and importance of production control and steps involved in production control.

UNIT-IV **Marketing Management**

Nature, scope and importance of marketing management. Modern Marketing concepts. Role of marketing in economic development. Marketing Mix. Marketing Information System. Meaning, nature and scope of International Marketing.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.Each question will be of equal marks.

Suggested Books:

Business Environment – Francis Charurilam (Himalaya Publishing House).
Management – Harold, Koontz and Cyrilo' Donell (Mc Graw Hill)
Principles of Personnel Management – Edwin B. Flippo (Mc Graw Hill)
Personnel Management and Industrial Relations – D.C. Sharma and R.C. Sharma) (SJ Publications, Meerut)
Basic Marketing – Cundiff and Still (PHI, India)
Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
Principles and Practice of Management – L.M. Prasad
Financial Management – I.M. Pandey (Vikas Publishing House, New Delhi)
International Marketing – Vorn terpestre and Ravi Sasathy.
Production Management – E.S. Buffa & W. H. Tausart, Richand D. Irwin, Homewood, Illionis.
Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

B.TECH VI SEMESTER
CONTROL SYSTEM ENGINEERING
(ECE-302E)

L	T	P				
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I :
INTRODUCTION: The control system-open loop & closed loop, servomechanism, stepper motor.
MATHEMATICAL MODELS OF PHYSICAL SYSTEMS: Differential equation of physical systems, transfer function, block diagram algebra, signal flow-graphs , Mason's formula & its application.
FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS: Feedback and non-feedback systems, Effects of feedback on sensitivity (to parameter variations), stability, overall gain etc.

UNIT-II:
TIME RESPONSE ANALYSIS: Standard test signals, time response of first order and second order systems, steady-state errors and error constants, design specification of second-order-systems.
STABILITY:The concept of stability ,necessary conditions for stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.
THE ROOT LOCUS TECHNIQUE:The Root locus concept, construction /development of root loci for various systems, stability considerations.

UNIT-III:
FREQUENCY RESPONSE & STABILITY ANALYSIS: Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode Plots, Nyquist stability criterion, Gain margin & Phase margin, relative stability using Nyquist Criterion, frequency response specifications.

UNIT-IV:
COMPENSATION OF CONTROL SYSTEMS: Necessity of compensation, Phase lag compensation, phase lead compensation , phase lag lead compensation, feedback compensation .
STATE VARIABLE ANALYSIS : Concept of state,state variable and state model, state models for linear continuous time systems, diagonalization solution of state equations, concept of controllability and observability.

NOTE :
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

TEXT BOOK:
1. Control System Engg : I.J.Nagrath & M.Gopal; New Age India.

Reference Books:
1. Automatic Control Systems : B.C.Kuo; PHI.
2.Modern Control Engg : K.Ogata; PHI.
3.Control Systems: Principles & Designing : Madan Gopal; TMH.

B.TECH V1th SEMESTER
VHDL AND DIGITAL DESIGN
(ECE-304E)

L	T	P				
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT I:
INTRODUCTION: History. Why use VHDL ? Hardware design construction, design levels, HDLs Hardware simulation and synthesis. Using VHDL for design synthesis, terminology.
PROGRAMMABLE LOGIC DEVICES :Why use programmable logic ? What is a programmable logic device ? Block diagram, macrocell structures and characteristics of PLDs and CPLDs. Architecture and features of FPGAs. Future direction of programmable logic.

UNIT II:
BEHAVIORAL MODELING:Entity declaration, architecture body, process statement, variable assignment, signal assignment. Wait, If, Case, Null, Loop, Exit, Next and Assertion statements. Inertial and transport delays, Simulation deltas, Signal drivers.
DATA FLOW AND STRUCTURAL MODELLING:Concurrent signal assignment, sequential signal assignment, Multiple drivers, conditional signal assignment, selected signal assignment, block statements, concurrent assertion statement, component declaration, component instantiation.

UNIT III:
GENERICS AND CONFIGURATIONS :Generiecs, Why configurations ?, default configurations, component configurations. Generiecs in configuration. Generic value specification in architecture, block configurations, architecture configurations.
SUBPROGRAMS AND PACKAGES :Subprograms – functions, procedures, declarations. Package declarations, package body, use clause, predefinal package standard. Design libraries, design file.

UNIT IV:
ADVANCED TOPICS :Generate Statements, Aliases, Qualified expressions, Type conversions, Guarded signals, User defined attributes, Predefined attributes., VHDL synthesis.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

D. Perry , VHDL, 3rd Ed.- TMH.
J.Bhasker, A.VHDL- Primer, PHI.
Skahil, VHDL for Programmable logic- 2nd Ed – Wiley.

B.TECH V1 SEMESTER
DIGITAL SIGNAL PROCESSING
(ECE- 306E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
DISCRETE TRANSFORMS: Z- transform and its properties, Inversion of Z-transform, One sided Z-transform and solution of differential equations. Analysis of LTI systems in Z-domain, causality, stability, schur-cohn stability test; relationship between Z-transform and Fourier transform. Frequency selective filters; all pass filters, minimum-phase, maximum-phase and mixed-phase systems.
Frequency domain sampling and DFT; properties of DFT, Linear filtering using DFT, Frequency analysis of signals using DFT, radix 2, radix-4, goertzel algorithm, Chirp Z-transform, applications of FFT algorithm, computation of DFT of real sequences. Quantization effects in computation of DFT.

UNIT – II:
IMPLEMENTATION OF DISCRETE TIME SYSTEMS: Direct form, cascade form, frequency sampling and lattice structures for FIR systems. Direct forms, transposed form, cascade form parallel form. Lattice and lattice ladder structures for IIR systems. State space structures Quantization of filter co-efficient structures for all pass filters.

UNIT – III:
DESIGN OF FIR FILTERS: Characteristics of practical frequency selective filters. Filters design specifications peak pass band ripple, minimum stop band attenuation. Four types of FIR filters Design of FIR filters using windows. Kaiser window method comparison of design methods for FIR filters Gibbs phenomenon, design of FIR filters by frequency sampling method, design of optimum equiripple FIR filters, alternation theorem.

UNIT – IV:
DESIGN OF IIR FILTERS: Design of IIR filters from analog filters, Design by approximation of derivatives, Impulse invariance method bilinear transformation method characteristics of Butterworth, Chebyshev, and Elliptical analog filters and design of IIR filters, Frequency transformation, least square methods, design of IIR filters in frequency domain.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
John G. Proakis, Digital Signal Processing, PHI
S. K. Mitra, Digital Signal Processing , TMH
Rabiner and Gold, Digital Signal Processing, PHI
Salivahan, Digital Signal Processing , TMH
Digital Signal Processing: Alon V. Oppenhelm;PHI

B. TECH. VI SEMESTER
DIGITAL COMMUNICATION
(ECE-308E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
PULSE MODULATION: sampling process, PAM and TDM; aperture effect. PPM noise in PPM, channel Bandwidth, Recovery of PAM and PPM signals Quantization process, quantization noise, PCM, μ Law and A- law compressors. Encoding, Noise in PCM, DM, delta sigma modulator, DPCM, ADM.

UNIT – II:
BASE BAND PULSE TRANSMISSION: Matched filter and its properties average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

UNIT – III:
DIGITAL PASS BAND TRANSMISSION: Pass band transmission model; gram Schmidt orthogonalization procedure, geometric Interpretation of signals, Response of bank of correlaters to noise input, detection of known signal in noise, Hierarchy of digital modulation techniques, BPSK, DPSK, DEPSK, QPSK, systems; ASK, FSK, QASK, Many FSK, MSK, Many QAM, Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

UNIT – IV:
SPREAD SPECTRUM MODULATION: Pseudonoise sequence, A notion of spread spectrum, direct sequence spread spectrum with coherent BPSK, signal space dimensionality & processing gain, probability of error, frequency spread spectrum, CDM.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

John G. Proakis, Digital Communication, PHI
Taub & Schilling, Principles of Communication, TMH
Simon Haykin, Communication systems, John Wiley & Sons

B.TECH V1 SEMESTER
COMPUTER COMMUNICATION NETWORKS
(ECE-310E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

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UNIT – I:
INTRODUCTION: Uses of Computer Networks, Network Hardware, Network Software, Reference models, Examples of Networks & Data communication Services, Network Standardization.
THE PHYSICAL LAYER: The Theoretical basis for Data communication, Transmission media, Wireless Communication, The Telephone System, Narrowband ISDN, Broadband ISDN and ATM, Cellular Radio, Communication Satellites.

UNIT – II:
THE DATA LINK LAYER: Data Link Layer Design issues, Error Detection & correction, Elementary Data Link protocols, Sliding Window Protocols, Protocol Specification & Verification, Example of Data Link Protocols.
THE MEDIUM ACCESS SUBLAYER: Aloha Protocols, LAN Protocols, IEEE Standards, Fiber optic Networks, Satellite Networks, Packet switching, radio Networks.

UNIT – III:
NETWORK LAYER: Design issues, routing algorithms, congestion control Algorithms, internetworking.
TRANSPORT & SESSION LAYER: Protocol design issues, connection Management, remote procedure calls.

UNIT – IV:
PRESENTATION LAYER: Design issues, abstract Syntax notation, data compression technique, cryptograph.
APPLICATION LAYER: Design issues, file transfer, access and management, electronic mail, virtual terminals, applications and examples.

Suggested Books:

Tanenbaum A.S, Computer Networks, PHI.
Forouzan B.A, Data Communications and Networking, Tata-Mc-Graw Hill.
Stallings W, Data and Computer Communications, PHI.
Ahuja V, Design and Analysis of Computer Communication, McGraw Hill.
Bee K.C.S, Local Area Networks, NCC Pub.
Davies D. W. Barber, Computer Networks and their Protocols, John Wiley.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

B.TECH VI SEMESTER
DIGITAL COMMUNICATION PRACTICAL
(ECE-312E)

L	T	P			
-	-	3	Sessional	:	50
			Viva	:	25
			Time	:	3Hrs

LIST OF EXPERIMENTS:

To Study PSK
To Study FSK
To Study IF Amplifier
To Study Balanced Modulator & Demodulator
To Study PCM
Setting up a Fiber Optic Analog Link
Setting up a Fiber Optic Digital Link
Losses in Optical Fiber
Measurement of Numerical Aperture
Time Division multiplexing of signals.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH V1th SEMESTER
ELECTRONICS DESIGN PRACTICAL
(ECE-314E)

L	T	P			
-	-	3	Exam	:	25
			Sessional	:	50
			Time	:	3Hrs

LIST OF EXPERIMENTS:

Design a single stage R C Coupled amplifier and plot its gain frequency response.
Design a two stage R C Coupled amplifier and plot its gain frequency response.
Design a R C Phase shift oscillator using IC 741.
Design a wein bridge oscillator.
Design a square wave generator using IC 555.
Design a 4 : 1 multiplexer and 1 : 4 demultiplexer using logic gates.
Design a parallel parity bit generator using ICs.
Design a digital to analog converter using ICs.
Design a digital frequency meter (0-999HZ) using IC 555 for monoshot, IC-7404,7408,7490,7447.
Design a controller such that LEDs glow in pairs sequentially using IC 7490 and LEDs.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH V1th SEMESTER
VHDL PRACTICAL
(ECE-316E)

L	T	P			
-	-	3	Exam	:	50
			Sessional	:	50
			Time	:	3Hrs

LIST OF EXPERIMENTS:

Write a VHDL Program to implement a 3 :8 decoder.
Write a VHDL Program to implement a 8:1 multiplexer using behavioral modeling.
Write a VHDL Program to implement a 1 :8 demultiplexer using behavioral modeling.
Write a VHDL Program to implement 4 bit addition/subtraction.
Write a VHDL Program to implement 4 bit comparator.
Write a VHDL Program to generate Mod- 10 up counter.
Write a VHDL Program to generate the 1010 sequence detector. The overlapping patterns are allowed.
Write a program to perform serial to parallel transfer of 4 bit binary number.
Write a program to perform parallel to serial transfer of 4 bit binary number.
Write a program to design a 2 bit ALU containing 4 arithmetic & 4 logic operations.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH VIIth SEMESTER
VLSI DESIGN
(ECE-401E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1 :
NMOS & CMOS Fabrication Process Sequence, Basic electrical properties of NMOs & CMOS inverters, MOS Design Process : Stick Diagram & Design rules.

UNIT 2 :
Delay in MOS Circuits, Scaling of MOS Circuits, Some design examples, inverter, NAND gates, Multiplexer, Logic Function Block.
Introduction to physical design of IC's Layout rules & circuit abstractor, Cell generation, Layout environments, Layout methodologies, Packaging, Computational Complexity, Algorithmic Paradigms.

UNIT 3:
Placement : Partitioning, Floorplanning, Placement.
Routing : Fundamentals, Global Routing, Detailed Routing, Routing in FPGA's.

UNIT-4:
Performance issues in Circuit Layout : Delay models, Timing Driven placement,TimingDrivenRouting,Via Minimization, Power Minimization, other issues.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.Each question will be of equal marks.

Suggested Books:

Pucknell DA & Eshraghian K, Basic VLSI Design, PHI.
Sanfarazdeh M. & Wong C.K , An Introduction to VLSI Physical Design,.Mc Graw Hill.
John P. Uyemura , Introduction to VLSI circuits and systems, John Wiley.

B.TECH VII SEMESTER
TELEVISION ENGINEERING
(ECE-403E)

L	T	P			
4	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
ELEMENTS OF A TELEVISION SYSTEM :
Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls. Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation. Composite Video signal , channel B.W. Vestigial side band transmission and reception, TV standards.

UNIT – II:
THE PICTURE TUBE : Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube circuit controls.Television Camera Tubes: Basic principal, Image orthicon, Vidicon, plumbicon.
MONOCHROME SIGNAL TRANSMISSION AND RECEPTION :Block diagram of Monochrome Signal Transmitter and Receiver, Explanation of different sections, Transmitting and receiving antennas.

UNIT-III
ELEMENTS OF COLOUR TV :Introduction, compatibility considerations, Interleaving process, Three color theory, Chrominance Signal, composite color signal, comparison of NTSC, PAL and SECAM Systems. color television display tubes (Delta gun, PIL, Trinitron).
Color signal transmission, bandwidth for color signal transmission.

UNIT – III:
ADVANCED TOPICS IN TV. ENGINEERING :Introduction, & working and block diagram of the Projector TV, 3D-TV, HDTV, Digital TV, Camcorders.
TELEVISION APPLICATIONS: Cable television, CCTV, picture phone & fascimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

AM Dhake, Monochrome and Colour TV, TMH.
R.R.Gulati, Colour TV.Engg. Wiley Eastern Ltd.
SP Bali, Colour TV theory & practice, TMH
Merrill I. Skolnik, Introducion to Radar Systems, TMH

B.TECH VII SEMESTER
OPTICAL COMMUNICATION
(ECE-405E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
INTRODUCTION : Propagation within the fiber, Numerical aperture of fiber, diffraction, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors.

UNIT – II:
LOSSES IN OPTICAL FIBER : Rayleigh Scattering Losses, Absorption Losses, Leaky modes, mode coupling losses, Bending Losses, Combined Losses in the fiber.
DISPERSION EFFECT : Effect of dispersion on the pulse transmission Intermodal dispersion, Material dispersion, Wave guide dispersion, Total dispersion, Transmission rate.

UNIT – III:
LIGHT SOURCES : LEDS, Laser Action in semiconductor Lasers, Semiconductor Lasers for optical communication – Laser modes, Spectral Characteristics, Power Voltage Characteristics, Frequency response.
DETECTORS : P-I-N Photodiode, APD Noise Analysis in detectors, Coherent and non-coherent detection, The fiber-optic Communication System, Infrared sensors(eg: TSOP 1738).

UNIT – IV:
OPTICAL NETWORKS: Optical coupler,space switches,linear divider-combiners,wavelength division multiplexer and demultiplexer,optical amplifier,optical link network-single hop ,multi-hop, hybrid and photonic networks.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

John Power, An Introduction to Fiber optic systems, McGraw Hill International.
John Gowar , Optical communication Systems.
R. Ramaswamy, Optical Networks, Narosa Publication

B.TECH VII SEMESTER
MICROWAVE ENGINEERING
(ECE-407E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:
MICROWAVE RESONATORS: Brief deacription of waveguides, coplanar waveguides,
cavity resonators: rectangular, cylindrical, spherical and coaxial , excitation and coupling of cavities, Q factor.
MICROWAVE MEASUREMENTS: Measurement of frequency, impedance (using slotted section) attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

UNIT – II:
MICROWAVE GENERATORS**:**Construction, characteristics, operating principle and typical applicationsof Klystron(two cavity, multicavity), Reflex Klystron, magnetron(Cylindrical magnetron and description of Π mode applications) and Traveling Wave Tube(TWT).

UNIT – III:
MATRIX DESCRIPTION OF MICROWAVE CIRCUITS: Scattering matrix-its properties, measurement of scattering coefficients, scattering matrices for common microwave systems.
MICROWAVE COMPONENTS: Waveguide tees- E-plane, H-plane, magic tee, rat race, directional coupler, tuning screws and stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, Wavemeters.

UNIT-IV.
SOLID STATE MICROWAVE DEVICES:
Tranferred electron devices- GUNN EFFECT; negative diffrerential resistance phenomenon, field domain formation , GUNN diode structure.
Avalanche transit time devices: , IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Samuel Y. Liao, Microwave Devices and Circuits, Prentice-Hall of India.
David M. Pozar, Microwave Engineering, John Wiley and sons Inc.
Das, Annapurna & Sisir K. Das, Microwave Engineering, Tata McGraw-Hill.
POZAR DM, Microwave Engg, John Wiley & Sons Inc.

B.TECH VII SEMESTER
DIGITAL SIGNAL PROCESSING PRACTICAL
(ECE-409E)

L	T	P			
-	-	3	Viva-voce	:	25
			Sessional	:	50
			Time	:	3 hrs.

LIST OF EXPERIMENTS:

Define a function to compute DTFT of a finite length signal. Plot the magnitude and phase plots using subplots. Use this function to obtain DTFT of a 21 point triangular pulse over the domain $-10<n<10$. Plot the results over $-\pi<w<\pi$.

Write a program to plot the following functions : a)impulse function b)unit step c)unit ramp d) exponential e) sinusoidal

Verify the Symmetry, time shifting and modulating properties of DTFT with a rectangular pulse of length 21.

Study the aliasing effect by using a Sinusoidal Signal. Show the plots of continuous time Signal. Sampled Signal and reconstructed signals by using subplot.

Study different window functions available in signal processing toolbox and their controlling parameters.

Write a program to plot real, imaginary phase and magnitude of exponential function.

Verify the properties of Discrete Fourier Transform (DFT).

Write a program to find the convolution of two sequences using in built convolution function

Study of Digital Signal Processing Kit (TMS/ADSP)

Implementations of FIR/digital filter using DSP Kit.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

B.TECH VIII SEMESTER
WIRELESS AND MOBILE COMMUNICATION
(ECE-402E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT – I:
Radio Propagation Characteristics, Models for Path loss, Shadowing & Multipath fading-delay spread, Coherence bandwidth, Coherence Time, Doppler Spread Jake's Channel model.

UNIT – II:
Digital Modulation for Mobile radio, Analysis under fading channel, diversity techniques and Rake demodulator. Introduction to Spread Spectrum Communication Multiple Access Techniques used in Mobile Wireless Communications: FDMA/TDMA/CDMA.

UNIT – III:
The Cellular concept, Frequency Reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, Cellular System, channel allocation schemes, Handover Analysis, cellular CDMA, Soft capacity, Erlang capacity comparison.

UNIT – IV:
Wireless standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Theodore S.Reppeport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.

William C.Y.Lec, Mobile Cellular Telecommunications, Analog and Digital Systems, Mc-Graw Hill Inc.

Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, Prentice Hall of India, New Delhi.

Kaveh Pahlavan and Allen H. Levesque " Wireless Information Networks", Wiley Series, John Wiley and Sons Inc.

B.TECH VIII SEMESTER
RADAR ENGINEERING
(ECE-404E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT 1.
RADAR BASICS: Radar Block Diagram & operation, Applications of Radar.
RADAR EQUATION: Simple form of Radar Equation, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

UNIT 2.
CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar.
MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI Pulse Doppler Radar, MTI from a moving platform.

UNIT 3.
TRACKING RADAR:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT 4.
RECEIVERS, DISPLAYS & DUPLEXERS:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

TEXT BOOK:
1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

REFERENCE BOOK:
Electronic Communication Systems : Kennedy; TMH

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

B.TECH. VIIth SEMESTER
MULTIMEDIA COMMUNICATIONS
(ECE-406E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3 Hrs

UNIT-1
Multimedia communications: Introduction, multimedia networks, multimedia applications.
Multimedia information representation: Introductiion, digitization principles, representation of text, images, audio & video.

UNIT-2
Text & Image compression: Various compression principles.
Text compression: Static Huffmann coding, dynamic Huffman coding, arithmetic coding, Lempel-ziv coding
Image compression: Graphics Interchange format, tagged image file format, digitized document, digitized pictures, JPEG (Introduction)

UNIT-3
Audio & Video compression:
Audio compression: Differential PCM, Adaptive diffential PCM, Code excited LPC, MPEG audio coders, Dolby audio coders.
Video Compression: Basic principles, Video compression standard H.261, h.263, MPEG(Basic introduction)

UNIT-4
Internet applications: Domain name system, name structure and administration, DNS resource records, Electronic mail message structure, content transfer, Basic concept of internet telephony, World Wide Web.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

SUGESSTED BOOKS:

Multimedia communications: Fred Halsall; Pearson Education Asia.
2. Multimedia Systems-Design: K. Thakkar; PHI
3. Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara Nahrstedt; Pearson
4 . Advanced Multimedia Programming: Steve Rimmer; MBI
5. Multimedia: Making it Work IIIrd edition: Tay Vaughan; TMH

B.TECH VIII SEMESTER
MICROWAVE (PRACTICAL)
(ECE-408E)

L	T	P			
-	-	3	Sessional	:	25
			Viva	:	25
			Time	:	3 Hrs

LIST OF EXPERIMENTS

To study the microwave components.
To study the characteristics of the reflex Klystron tube and to determine its electronic tuning range.
To determine the frequency and wavelength in a rectangular waveguide working in TE IO mode.
To determine the standing wave ratio and reflection coefficient.
To study the I-V characteristics of Gunn diode.
To study the magic tee.
To study the isolator and attenuator.
To measure the coupling coefficient and directivity of a wave guide directional coupler
To measure the polar pattern and the gain of a waveguide horn antenna.
To measure the insertion loss and attenuation.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

AUDIO VISUAL ELECTRONICS (PRACTICAL)
(ECE-410E)

L	T	P			
-	-	3	Sessional	:	25
			Viva	:	25
			Time	:	3 Hrs

LIST OF EXPERIMENTS

1. Familiarization of PCBs and Mechanical Components of Tape recorder/ CD Player/VCD Player/Colour TV.
2. Study of tuner section of a Colour T.V.
3. Study of VIF section of a Colour T.V.
4. Study of Sound section of a Colour T.V.
5. Study of Chroma section of a Colour T.V
6. Study of Mechanical portion of VCD player.
7. Study of Sound processing of VCD player.
8. Study of Camcorder's mechanical portion.
9. Study of Camcorder's Electronic portion.

NOTE: At least 09 experiments are to be performed with atleast 7 from above list, remaining 2 may either be performed from the above list or designed & set by concerned institution as per the scope of the syllabus.

DEPARTMENTAL ELECTIVES-I

B.TECH VIIth SEMESTER
MICROCONTROLLERS
(ECE-415E)

L	T	P				
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1:
INTRODUCTION :Comparing Microprocessors and Microcontrollers. Technological trends in Microcontrollers development. Survey of microcontrollers- 4 bit, 8 bit, 16 bit, 32 bit microcontrollers. Applications of microcontrollers.

UNIT 2:
8051 ARCHITECTURE :Block diagram, pin. Diagram of 8051. Functional descriptions of internal units,
registers, PSW, internal RAM, ROM, Stack, Oscillator and Clock. I/O Pins, Ports and Circuits Connecting external memory. Counters and timers. Serial data interrupt. Serial data transmission /reception and transmission modes. Timer flag interrupt. External interrupt, software generated interrupts. External memory and memory space decoding, expanding I/Os, memory mapped I/O Reset & CLK Circuits.

UNIT 3:
8051 INSTRUCTION SET AND PROGRAMMING :8051 Instruction syntax, addressing modes, Data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions. Interrupts and interrupt handler subroutines. Writing assembly Language programs. Time delays. Pure S/W time delays. S/W polled timer. Pure H/W delay. Lookup tables. Serial data transmission using time delays and polling. Interrupt driven serial transmission and reception.

UNIT 4:
8051 APPLICATIONS: Interfacing Keyboards Programs for small keyboards and matrix keyboards. Interfacing multiplexed displays, numeric displays and LCD displays. Measuring frequency and pulse width. Interfacing ADCs & DACs. Hardware circuits for handling multiple interrupts. 8051 Serial data communication modes- Mode 0, Mode 1, Mode 2 and Mode 3.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

K.J.Ayala, The 8051 Microcontroller – 2nd ed. Penram International.
Intel's manual on " Embedded Microcontrollers"

DEPARTMENTAL ELECTIVE-I

B.TECH VIIth SEMESTER
BIOMEDICAL SIGNAL PROCESSING
(ECE-417E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I :
Introduction: Importance of Computers in Signal Processing, Basic Electrocardiography ECG lead System, ECG Signal Characteristics, Signal Sampling. Signal conversion.
Digital Filters : Z- transform, elements of digital filters, Types of digital filters, Transfer function of a difference equation Z-plane pole-zero plot.
FIR Filters : Characteristics, Smoothing Filters, Notch Filters, Derivatives, Window Design, Frequency Sampling, Minimax Design.
IIR Filters : Generic Equations, One pole and two pole filters Integrators.

UNIT-II:
Integer Filters: Basic Design Concept, Low Pass, High Pass, Band Pass, Band reject filters, Effect of cascading of filters, fast operating design techniques.
Adaptive Filters : Principal noise canceller model, GO Hz. Adaptive Canceling, Applications.

UNIT-III:
Signal Averaging : Signal averaging as a digital filter, a typical averager, Software for signal averaging, limitations, Data Reduction Techniques – Turning Point Algorithm, AZTEC Algorithm, Fan Algorithm, Huffman Coding. Fourier Transform, Correlation, convolution, Power Spectrum Estimation.

UNIT-IV:
ECG QRS Detection: Power Spectrum of ECG, Band Pass Filtering Techniques, Differentiation Techniques, Template Matching, QRS Detection Algorithm.
ECG Analysis System : ECG Interpretation, ST Segment Analyzer, Portable Arrhythmia Monitor.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

WJ.Tompkin, Biomedical Signal Processing edition , PHI
JG Proakis, Digital Signal Processing , PHI
Salivahanan, Digital Signal Processing, Tata Mc-Graw Hill.

DEPARTMENTAL ELECTIVES-I

B.TECH VIIth SEMESTER
RELIABILITY
(ECE-419E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1:

INTRODUCTION: Definition of reliability, failure data analysis, mean failure ratio, MTTF, MTBF, graphical plot, MTTF in terms of failure density, generalization, reliability in terms of failure density (integral form), reliability in other situation.

HAZARD MODELS: Introduction, constant hazard linearly increasing hazard, Weibull model, on density function and distribution function, and reliability analysis, important distribution and its choice, expected value, standard deviation and variance, theorem concerning expectation and variance.

UNIT 2:

SYSTEM RELIABILITY: Introduction, series system with identical component, reliability bounds-classical approach Bayesian approach application of specification hazard models, an r-out-of-an structure methods for solving complex system, systems not reducible to mixed configuration, mean time to failure system, logic diagrams, Markov model and graph.

RELIBILITY IMPROVEMENT AND FAULT TREE ANALYSIS: Introduction, improvement by component, redundancy, element redundancy, unit redundancy, optimization, stand by redundancy, reliability-cost trade off, fault tree construction, calculation of reliability from fault tree.

UNIT 3:

MAINTAINABILITY, AVAILABITY AND REPAIRABLE SYSTEM:Introduction, maintainability, availability, system down time, reliability and maintainability trade off, instantaneous repair rate MTTR, reliability and availability function.

BAYESIAN APPROXIMATION AND RELIABITY ESTIMATION: Introduction, Lindley's expansion, reliability estimation, normal, Weibull, inverse gaussian and Rayleigh.

UNIT 4:

RELIABILITY ALLOCATION AND APPLICATION: Reliability allocation for a series system, approximation of reliability in a computer system and nuclear power plant, failure models and effects analysis (FMEA)

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

S.K.Sinha, Reliability and life testing, (WEL New Delhi).
L.A.Srinath, Reliability engineering, (EWP New Delhi).
Bal Guru Swami, Quality control and Reliability, (Khanna publisher New Delhi).

DEPARTMENTAL ELECTIVES-I

B.TECH VII SEMESTER
NANOTECHNOLOGY
(ECE- 421E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1
Introduction to Nanotechnology, review of various techniques and tools, future prospects of nanotechnology, applications.

UNIT 2
Synthesis techniques of clusters, nanoparticles : classical nucleation theory for cluster formation, sputtering and thermal evaporation and laser methods for nanoparticles' synthesis, particle synthesis by chemical routes.
Synthesis of semiconductor nanoclusters.

UNIT 3
Properties of nanostructured materials :
Magnetic properties, electrical transport properties, non-linear optical properties.

Special nanomaterials
Porous silicon nanostructures – formation, optical properties; Fullernes – synthesis, properties and application.

UNIT 4.
Nano electronics – Nanodevices, nanotransistors, nanoelectro optics, Nano structures in electronics.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

1. Camarata, R.C, Nanomaterials synthesis, properties and application . Institute of Physics Publication.
2. Madou, Fundamentals of microfabrication, Mcgraw Hill.
3. Sibelia, J.P , A Guide to material characterization, Prentice Hall.

DEPARTMENTAL ELECTIVES-II

B.TECH VIIth SEMESTER
ADVANCED MICROPROCESSORS
(ECE-423E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

INTEL'S X86 FAMILY :Introduction, Register set, data formats, addressing modes, interrupts, memory hierarchy, pipelining, segmentation, paging, real and virtual mode execution, protection mechanism, task management.

UNIT-II

ARCHITECTURE OF INTEL X86 FAMILY :CPU block diagrams, Pin diagrams and internal descriptions of -80286,386,486 and Pentium. Instruction formats. Intel X86 Instruction set. Assembler directives.

UNIT-III

ARITHMETIC CO-PROCESSORS : Data formats; 80287 architecture – Pin diagram, internal architecture, status register, control register; tag register. Instruction set – data transfer, arithmetic, omparison, transcendental operations, constant operations and control instructions. Interfacing 80287 with 80286 Programming examples.

UNIT-IV

HIGHER- CO-PROCESSORS :Introduction to 80387,80487.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggeted Books:

Daniel Tabak, Advanced Microprocessors (2nd ed) Mc Graw Hill Pub.
Barry B.Brey, The Intel Microprocessors (4th ed) PHI Pub.
DV-Hall , Microprocessors & Interfacing (2nd ed) Mc Graw Hill Pub.

DEPARTMENTAL ELECTIVES-II

B.TECH VII SEMESTER
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
(ECE- 425E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

Introduction: - Definition of AI, evolution of Computing, History of AI, Classical, Romantic and Modern period, subject area, Architecture of AI machines, logic family, conclusion.

Production System: - Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, Regency, specificity, alternative approach for conflict resolution, Architecture of production system, conclusion.

UNIT-II

Prepositional Logic: - Proposition, tautologies, Theorem proving in prepositional logic, Semantic method of theorem proving, forward chaining, backward chaining, standard theorems in prepositional logic, method of substitution, theorem proving using Wang's algorithm, conclusion.

Predicate Logic: - Alphabet of First order logic (FOL), predicate, well formed formula, clause form, algorithm for writing sentence into clause form, inflict of predicates, unification algorithm, resolution Robinson's inference rule, conclusion.

UNIT-III

Logic Programming and Prolog: - Logic program, Horn clause, program for scene interpretation, unification of goals, definite perform clause, SLD resolution, SLD tree, controlling back tracking, common use of cut, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replace cut-fail by not, conclusion.

Default & Non monotonic reasoning: - Axiomatic theory, non-atomic reasoning using NML-I, problems with NML-I, reasoning with NML-II, truth maintenance system with example, conclusion.

UNIT-IV

Imprecision & Uncertainty: - Definition, Probabilistic technicians, Fuzzy reasoning, certainty factor based reasoning conditional probability, Baye's Theorem and its limitations, Bayesian belief network, propagation of belief, Dempster-Shafer theory of uncertainty management, belief interval, Fuzzy ration, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion scope of neural network, EX-OR classifier, clustering by neural network, function approximation by neural net, retrieval of content, Fuzzy association memory, cognitive reasoning using fuzzy neural net, Hebbian learning, stability analysis.

Intelligent Search Technique: - Heuristic function, AND-OR graph, Heuristic search, A* algorithm and examples.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

Suggested Book:

1. E.Charniak & D. McDermott , Introduction to Artificial Intelligence , Addison Wesley Longman.

DEPARTMENTAL ELECTIVES-II

B.TECH VIIth SEMESTER
POWER ELECTRONICS
(ECE-427E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-1.

INTRODUCTION :Role of power electronics, review of construction and characteristics of power diode, Schottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors

UNIT-2.

CONVERTERS :One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT-3

INVERTERS :Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

UNIT-4.

CHOPPERS : Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

CYCLOCONVERTERS : Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

TEXT BOOK:

1. Power Electronics : MH Rashid; PHI

REFERENCE BOOKS :

1. Power Electronics : PC Sen; TMH
2. Power Electronics : HC Rai; Galgotia
3. Thyristorised Power Controllers : GK Dubey, PHI
4. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai
5. Power Electronics: P.S Bhimra.

Note:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
IMAGE PROCESSING
(ECE – 420E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:

INTRODUCTION: Image Processing Fourier Transform and Z-Transform Causality and stability Toeplit and Circulate Metrics orthogonal and unitary Matrices and Kronecker product, Markov Processes KI Transform Mean square Estimates and Orthogonal Principles.

IMAGE SAMPLING QUANTIZATION : Band Limited Image Sampling Versus Replication, Reconstruction of Image from samples Sampling Theorem, Sampling Theorem for Random Fields, Optimal Sampling, Nonrectangular Grid Sampling, Sampling Aperture, Display Aperture/ Interpolation Functions, Lagrange Interpolation Moire Effect. Image Quantization Uniform Optimal Quantizer, Properties of Mean Square Quantizer, Commander Design Visual Quantization

UNIT – II:

IMAGE TRANSFORMS: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional and Two Dimensional DFT Cosine and Sine Transforms. Hadamard, Slant, Harr and KL, Transforms and their properties, Approximation to KI Transforms.

IMAGE REPRESENTATION BY STOCHASTIC MODELS: One Dimensional Causal Models, AR and ARMA models, Non Causal Representation Spectral factorization, Image Decomposition.

UNIT – III:

IMAGE ENHANCEMENT AND RESTORATION: Point Operation, Histogram Modeling, Spatial Operations, Transform Operations, Multispectral Image Enhancement. Image Observation Models, Inverse and Wiener filtering; FIR Wiener Filters, Filtering using Image Transform Causal Models and recursive filtering Maximum entropy restoration. Extrapolation of band limited signal.

UNIT – IV:

IMAGE ANALYSIS AND IMAGE COMPRESSION: Spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representations structures, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Techniques, Transform Coding Theory, Coding of Image, Coding of two-tone image.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Anil Jain, Digital Image Processing , PHI.
Gonzalez and Woods, Image Processing, Addison Wesley & Sons.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
ADVANCED CONTROL SYSTEMS
(ECE- 422E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT1.
State variable representation of systems by various methods, solution of state equations- state transition matrix, Transfer function from state variable model. Controllability and observability of state variable model.

UNIT2.
Phase portrait of linear second systems, Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

UNIT3.
Definition, limitations, use of describing function for stability analysis, describing function of ideal relay, relay with hytsteresis and dead zone, saturation/columb friction and backlash. Linear approximation of nonlinear systems: Taylor series, Liapunov's 2nd method.

UNIT4.
Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shanoon's theorem, reconstruction of sampled signal o order and first order hold, Z-transform, definition, evaluation of z-transform, inverse Z-transform pulse transfer function, limitation of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-hurwitz criterion to discrete time systems.
NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:
1. Gopal M, Digital Control and State Variable Methods, TMH
Kuo,BC, Digital Control systems,
3. Slotine JE & Li WP, Applied Non-Linear Control , Prentice Hall, USA.

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
EMBEDDED SYSTEMS DESIGN
(ECE-424E)

L	T	P			
3	1	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT 1 : INTRODUCTION:
Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:
Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:
Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial pheriphal device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : PROGRAMMING WITH MICROCONTROLLERS:
Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.
DESIGNING USING MICROCONTROLLERS:
Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

TEXT BOOK:
1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

REFERENCE BOOKS :
1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

DEPARTMENTAL ELECTIVES-IV

B.TECH VIIIth SEMESTER
NEURO-FUZZY SYSTEMS
(ECE-426E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I :
INTRODUCTION TO FUZZY AND NEURO-FUZZY SYSTEMS: Merits of Fuzzy and Neuro Fuzzy systems. Introduction to Architecture of a Fuzzy systems, fuzzification Rule Base, Inference engine, defuzzizication.
FUZZY MATHEMATICS: Fuzzy sets and operations of fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs & Fuzzy arithmetic.

UNIT-II :
ARCHITECTURE AND DESIGN ISSUES : - Fuzzification , fuzzy Rule – Base and Fuzzy – Rule Based models – implication process, defuzzification Techniques.
ANALOG DESIGN OF FUZZY PROCESSORS: Modular design, design of a fuzzifier, knowledge base and inference engine, defuzzifier design.

UNIT-III :
IMPLEMENTATION OF A COMPLETE ANALOG FUZZY SYSTEMS : Design and microprocessor based implementation of Fuzzy systems.
FUZZY MODEL IDENTIFICATION: Structure Specifications, Parameter estimation, model validation.

UNIT-IV :
NEURO FUZZY SYSTEMS: Introduction to Neural Networks, Neuro Fuzzy Architecture, Learning methodologies. Genetic Algorithms, neural networks in communications.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

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Suggested Books:

KLIR & YUAN, Fuzzy Sets and Fuzzy Logic .
CHIN-TENG LIN & C.S. GEORGE LEE, Neural Fuzzy Systems, Prentice Hall International, 1996.
N.K.Bose, P.Liang, Neural Networks Fundamentals with graphs, Algorithms and Applications, Tata McGraw Hall, Ed. 1998.

DEPARTMENTAL ELECTIVES-IV

B.TECH VIII SEMESTER
ELECTRONIC SWITCHING SYSTEMS
(ECE-428E)

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT – I:

INTRODUCTION: Statistical Bandwidth Sharing, Switching, network Configurations, Elements of switching systems, Electronic exchange, PBX.

TELEPHONE NETWORKS: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling techniques Common Channel Signaling.

UNIT – II:

ELECTRONIC SPACE DIVISION SWITCH: Stored Program Control (SPC): Centralized & Distributed SPC, Software Architecture, and n-stage networks.

TIME DIVISION SWITCHING: Space Switching, Time Switching, Time multiplexed space switching & Time Switching, n-stage combination switching.

UNIT – III:

TRAFFIC ENGINEERING: Traffic load, Grade of service, blocking Probability models of switching systems, Markov processes, Birth-Death processes, delay systems, Models for packetized sources (voice and video), models for traffic flow in packet networks.

CELLULAR MOBILE TELEPHONY: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

UNIT – IV:

TELEPHONE NETWORK PROTOCOLS: Protocols stacks, Digital Transmission hierarchy, SONET/SDH Signaling system. Multi Media Communication over global telephone N/W Introduction to Datagram switches, ATM Switches.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit. Each question will be of equal marks.

Suggested Books:

Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
Keshav, S., Engineering. Approach to Computer Networking, Addison Wesley.

DEPARTMENTAL ELECTIVES-IV

B.TECH. VIIIth SEMESTER
TRANSDUCERS AND THEIR APPLICATIONS
ECE-430E

L	T	P			
3	2	-	Theory	:	100
			Sessional	:	50
			Time	:	3Hrs

UNIT-I

Definition of transducer. Advantages of an electrical signal as out-put. basic requirements of transducers, Primary and Secondary Transducer ,Analog or digital types of transducers.
Resistive, inductive, capacitive, piezoelectric, photoelectric and hall effect tranducers.

UNIT-II

Measurement of pressure – Manometers, Force summing devices and electrical transducers
Measurement of temperature – Metallic resistance thermometers, semi conductor resistance sensors (Thermistors), thermo-electric sensors, pyrometers.

UNIT-III

Measurement of displacement – Potentiometric resistance type transducers, inductive type transducers, differential transformer (L.V.D.T), capacitive transducers, Hall effect devices, strain gage transducers.
Measurement of velocity – variable reluctance pick up, electromagnetic tachometers, photoelectric tachometer, toothed rotor tachometer generator..

UNIT-IV

Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer.
Measurement of Torque – Torque meter, torsion meter, absorption dynamometers, inductive torque transducer, digital methods.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit Each question will be of equal marks.

Suggested Books:

1. B.C. Nakra, K.K. Chaudhry, “Instrumentation Measurement and Analysis,” Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Thomas G. Beckwith etc. all, “Mechanical Measurements (International Student Edition), Addison-Wesley Longman, Inc. England.
3. A.K. Sawhney, “ A Course in Electrical and Electronic Measurements and Instrumentation,” Dhanpat Rai & Sons, Delhi-6.