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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, Parseval'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**

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

**Reference Book**

1. Complex variables and Applications : R.V. Churchill; 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 question, taking two from each unit. Students will be required to attempt five questions taking at least one from each unit.

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## B.Tech-III Sem

EE-203-E

### NETWORK ANALYSIS & SYNTHESIS

L T P	Sessional	:	50	Marks
3 1 0	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.

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## **ELE : 201 E      ELECTROMECHANICAL ENERGY CONVERSION**

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 ELECTROMECHANICAL 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 in 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, commutation, 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 test of 3 phase and 1 phase motor.

#### **Text Book :**

1. Electrical Machines : P.S. Bimbhra; Khanna

#### **Reference :**

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

**NOTE :** Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

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**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 : continuous & 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, postfix 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. Seymour 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
- **ote:** 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 at least one from each unit.

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**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 sensor 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:**

1. Integrated Electronics: Millman & Halkias; Mc Graw Hill.
2. Electronic circuit analysis and design (Second Edition): D.A. Neamen; TMH

**REFERENCE BOOKS:**

1. Electronics Principles: Malvino; Mc Graw Hill.
2. Electronics circuits: Donald L. Schilling & Charles Belove: Mc Graw Hill.
3. Electronics Devices & Circuits: Boylestad & Nashelsky; Pearson.

**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.

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**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**

**TRANSMITTER 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:**

1. Taub & Schilling, Principles of Communication Systems, TMH.
2. Mithal G K, Radio Engineering, Khanna Pub.
3. Simon Haykin, Communication Systems, John Wiley.
4. Dungan F.R., Electronics Communication System, Thomson-Delmar
5. 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.

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Theory         :       50  
Sessional       :       25  
Total            :       75

Duration of Exam : 3 Hrs.

**LIST OF EXPERIMENTS**

1. To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.
2. To perform Sumpner's back to back test on-phase transformer.
3. Parallel operation of two 1-phase transformers.
4. Study of construction of a DC machine.
5. To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.
6. Speed Control of a DC motor by armature control & field control methods.
7. Open circuit & Block test of 1-phase induction motor.
8. Light running & block rotor test of 3-phase I.M. with starting.
9. To plot V curve of a synchronous motor.
10. To study scott connection of transformer.
11. To study starting running & reversal of direction of 3-phase I.M.
12. 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.

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**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.

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**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. Study of AM Modulation/Demodulation
2. Study of FM Modulation/Demodulation.
3. Study of Diode detector and AGC.
4. To study Sampling theorem.
5. Sensitivity of a superhet Receiver.
6. Selectivity of a superhet Receiver.
7. Fidelity of a superhet Receiver.
8. Study of Pulse Amplitude Modulation/Demodulation.
9. Study of Pulse Width Modulation/Demodulation.
10. Study of Pulse Position Modulation/Demodulation.

**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.

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## **BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS & MANAGEMENT**

HUM – 201 E	Sessional	:	50	Marks
L    T    P	Theory	:	100	Marks
3    1    -	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.

### **TEXT BOOKS :**

1. “Modern Economic Theory” Dewett, K.K., S. Chand & Co.
2. “Economic Analysis” K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. “Micro Economic Theory” M.L. Jhingan (Konark Publishers Pvt. Ltd.).
4. “Principles of Economics” M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).
5. “An Introduction to Sociology”, D.R. Sachdeva & Vidya Bhusan.
6. “Society – An Introductory Analysis”, R.M. Maclver Charles H. Page.
7. “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

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

L T P  
3 1 -

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

**UNIT-I**

**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 Integration – Trapezoidal rule, Simpson's  $1/3^{\text{rd}}$  Rule &  $3/8^{\text{th}}$  rule, Weddle's Rule.

**UNIT-II**

**Difference Equations:** - Formation of Difference Equation, Solution of Linear Difference Equations.

**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.

**UNIT-III**

**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.

**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.

**UNIT-IV**

**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.

**Statistical Methods:-** Method of Least Square and Curve fitting.

**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.

**NOTE:**

The Examiners will set Eight Questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

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**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 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:**

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. Doebelin 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.

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## DIGITAL ELECTRONICS

(ECE-204E)

L T P  
3 1 -

THEORY : 100 Marks  
SESSIONAL : 50 Marks  
TOTAL : 150 Marks  
TIME : 3 HRS

### 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 McCluskey methods of simplification.

### UNIT 2 COMBINATIONAL DESIGN USING MSI DEVICES

Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtractors. 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-2R 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. Modern 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 one question from each unit. Students will be required to attempt five questions in all.

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

**SIGNAL****UNIT-I**

**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.

**SYSTEM****UNIT-III**

**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 :**

1. Fred J Taylor –“Principles of Signals and System”, MGH.
2. Simon Haykins – “Signal & Systems”, Wiley Eastern
3. A Papoulis – “Circuit and System” Modern Approach HRW

**NOTE:** Eight questions are to be set in total covering entire course selecting two questions 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.

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**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.

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

L T P  
- - 3

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

**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.

**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.

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

L T P  
- - 3

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

**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 synchronous Up/down counter using J-K flip-flops & drive a seven-segment display using the same
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:**

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.

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**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 Range-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.

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