

Unit – I

Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

UNIT - II

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues.

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

UNIT – III

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

UNIT – IV

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting.

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

UNIT - V

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary

indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

Text books:

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse et al, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.

Supplementary reference books:

1. K Loudon, "Mastering Algorithms With C", Shroff Publisher & Distributors Pvt. Ltd.
2. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons, Inc.
3. Adam Drozdek, "Data Structures and Algorithms in C++", Thomson Asia Pvt. Ltd.(Singapore)

TEC-401

ELECTROMAGNETIC FIELD THEORY

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Unit-I

Review of Vector analysis, Rectangular, Cylindrical and Spherical coordinates and their transformation. Divergence, gradient and curl in different coordinate systems. Electric field intensity, Electric Flux density, Energy and potential.

Unit-II

Current and conductors, Dielectrics and capacitance, Poisson's and Laplace's equation.

Unit-III

Steady magnetic field, magnetic forces, materials and inductance, Time varying field and Maxwell's equation.

Unit-IV

Uniform plane waves, Plane wave reflection and dispersion.

Unit-5

Transmission lines and guided waves

Text Book

1. Hayt, W.H. and Buck, J.A. 'Engineering Electromagnetics Tata McGraw Hill Publishing Co. Ltd., New Delhi Seventh edition.
2. Krauss, F 'Electromagnetics ' Tata McGraw Hill Fifth edition.

Reference Books

1. Jordan E.C. and Balmain K.G. 'Electromagnetic' wave and radiating systems. PHI Second edition.
2. Ramo S, Whinnery T.R. and Vanduzer T, 'Field and Waves in Communication electronics' John Wiley and Sons Third edition.

Unit-I: Signals and Systems

Continuous-time and discrete-time Signals, Transformations of the Independent Variable, Exponential and Sinusoidal Signals, Continuous-Time and Discrete-Time LTI Systems and their properties, convolution sum and convolution integrals, LTI System described by differential and difference equation.

Unit-II: Fourier series and Fourier Transformer**10**

The response of LTI Systems to Complex Exponentials, Fourier Series Representation of Continuous-time Periodic Signals and their Properties, Continuous time and discrete time Fourier Transforms and their properties, System Characterized by Linear Constant Coefficient Differential equations and Difference equation.

Unit-III: Time and Frequency Characterization of Signals and Systems 6

Magnitude Phase Representation of the Fourier Transform, Magnitude Phase Representation of the Frequency response of LTI systems, Time domain Properties of Ideal Frequency Selective filter, Time Domain and Frequency Domain aspects of Non ideal filters, First Order and Second Order Continuous Time and Discrete time Systems.

Unit-IV: Sampling and Laplace Transform**6**

Signal representation by samples, sampling theorem, Impulse train sampling, sampling of discrete time signals, discrete time processing of continuous time signals. Laplace Transform, Region of convergence, inverse Laplace Transform, Analysis and characterization of LTI System, Block diagram representation, Unilateral Laplace transform.

Unit-V : Z-Transform

8

Z-Transform, Region of convergence, Inverse Z-transform, analysis and characterization of LTI system, Block diagram representation, Unilateral Z-transform.

Text Book

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'signals & System', PEARSON Education, Second Edition, 2003.

Reference Book

1. Roberts, "Signals and Systems" TATA McGraw Hills.
2. P. Ramesh Babu, R. Ananda Natarajan, ."Signals and Systems", SCITECH Publications.
3. Charles L. Phillips, John M.PARR and EVEA. RISKIN, "Signals, Systems and Transforms", PEARSON Education, Third Edition.
4. Chen 'Signals & Systems, Oxford University, Press.

TEC-403

SEMICONDUCTOR MATERIALS AND DEVICES

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Unit-I: Crystal Properties and charge Carriers in Semiconductors

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1. Elemental and compound semiconductor materials, crystal lattice structure.
2. Bonding forces and energy bands in solids, charge carriers in semiconductors, carrier concentrations, drift of carriers in electric and magnetic fields.

Unit-II: Excess Carriers in Semiconductors

7

3. Optical absorption, luminescence, carrier life time and photo conductivity, diffusion of carriers.

Unit-III: Junction Properties

8

5. Equilibrium conditions, biased junctions, steady state conditions, break down mechanism (rectifying diodes, Zener diodes).
6. Transient conditions, metal semiconductor junctions, hetero junctions, (Varactor Diode, switching diodes and Schottky diodes.)

Unit-IV : Transistors and Optoelectronic Devices

9

7. Bipolar junction transistors: Fundamentals of BJT operation, amplification with BJTs, metal semiconductor field effect transistors (MESFET), metal insulator semiconductor field effect transistors (MISFET), Construction, Operation and characteristics of above devices.

8. Photodiodes, photo detectors, solar cell, light emitting diodes, light emitting materials, optical fibre, semiconductor lasers, material for semiconductor lasers.

Unit-V: Negative Conductance Microwave Devices and Power Devices 8

9. Tunnel diodes, degenerate semiconductors, transit time device: the IMPATT diode, the transferred electron mechanism: The GUNN diode.
10. Four layer devices : P-N-P-N diode, semiconductor controlled rectifier (SCR), bilateral devices : DIAC, TRIAC, IGBT.

Text Book

1. Ben G. Streetman, "Solid state electronic devices", Perason Eduction, 2003, Fifth edition.

Reference Books:

1. J. Millman and Halkiyas, "Integrated Electronics", TMH, 2002.
2. S.M. Sze, "Physics of Semiconductor devices", John Wiley.
3. Adir Bar-Lev, "Semiconductor and electronic devices", PHI.
4. D.A. Neaman, "Semiconductor physic and devices – basic principles", Home wood IL, 1992.

TEE-406

ENERGY CONVERSION

**L T P
3 1 0**

UNIT-I

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Basic Concepts in Rotating Machines: Elementary Machines, Synchronous Machines. d.c. Machine. Generated voltage of a.c. winding, distributed winding, hormonic content in distributed winding.

Rotating Magnetic field: Physical picture, Torque in round rotor machine. Operations of Basic Machine Type : Synchronous machines, a.c. machines, d.c. machine, Matching characteristics of electric machines and load.

UNIT- 2

8

D.C. Motor: Introduction, e.m.f. and torque e.m.f equations, torque equation, power balance, liner magnetization circuit model, Generating mode, motoring mode, armature reaction, compensating winding, commutation, method of excitation, **Characteristics of D.C. motor** : Shunt, Series compound. Starting of D.C. motor, speed control of d.c. motor, breaking of d.c. motors.

Unit-3

8

Synchronous Motor: Introduction, Basic machine model, circuit model, determination of armature reaction, operating characteristics of motoring machine, operation at constant load with variable excitations.

Induction Motor:

Introduction, Constructions, flux and e.m.f. wave in induction motor, slip and frequency on rotor current, rotor e.m.f. and torque production, equivalent circuit, torque slip characteristics, break down torque, starting torque, starting of induction motor, speed control.

Unit-4

8

Motor Control by Static Power Converter

Motivation – Characterizes of power devices: Diode, SCR, TRIAC, GTO, Power transistor, Power MOS, IGBT, SIT, SITH, MCT. Power converter : a.c./d.c. converter, a.c./ac. Converter, d.c./d.c. converter, d.c./a.c. Converter, control, D.c. motor control through converters, single phase converter, discontinuous armature current, full converter, torque speed characteristics, dual converter, control of d.c. series motor, these phase converter.

UNIT-5

8

Chopper control of d.c. motor:

Principle of operation, slip-up chopper, voltage and current wave forms, commutation A.C. motor control: Slip power recovery schemes, state kramer drive, phase control of induction motor.

Inverters:

Single phase half-bridge inverter, single-phase bridge inverter, three phase inverter, voltage and harmonic control of inverter, PWM inverter, sinusoidal pulse inverter.

Text Books:

I.J. Nagrath, D.P. Kothari: Electric Machines, TMH 2nd Ed.

Reference Books:

1. Fitzgarald, Kingsley, Kusko, Dumas : Electrical Machines, TMH.
2. M.H. Rashid : Power Electronic Circuits. Devices and applications, PHI.

PCS 457

DATA STRUCTURES LAB

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Write Program in C or C++ for following.

- Array implementation of Stack, Queue, Circular Queue, List.
- Implementation of Stack, Queue, Circular Queue, List using Dynamic memory Allocation.
- Implementation of Tree Structures, Binary Tree, Tree Traversal, Binary Search Tree, Insertion and Deletion in BST.
- Implementation of Searching and Sorting Algorithms.
- Graph Implementation, BFS, DFS, Min. cost spanning tree, shortest path algorithm.

TEC-451

ELECTRONICS LAB-II

**L T P
0 0 2**

1. Study of single stage RC-coupled BJT amplifier (frequency response. Max. signal handling capacity, input impedance)
2. Study of single RC coupled FET amplifier (frequency response, max. signal handling capacity input impedance)
3. Realization of fixed frequency Wein-bridge oscillator.
4. Application of operational amplifiers as summer, difference and integrator.
5. Op-Amp used as instrumentation amplifier.
6. Study of Electronic components
7. Step down transformer winding of less than 5VA.
8. Fabrication of DC unregulated power supply
9. PCB Lab: (a) Artwork & printing of a simple PCB. (b) Etching & drilling of PCB. (c) Testing of power supply fabricated in Experiment No. 6 (d) Mini Project

PEE- 456

ENERGY CONVERSION LAB

**L T P
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Minimum 8 experiments are to be performed from the following:

1. To obtain speed torque characteristics of a dc shunt motor.
2. To obtain speed torque characteristics of a dc series motor.
3. To run a dc shunt motor clockwise as well as anticlockwise.
4. To control the speed of a dc motor by field control.
4. To control the speed of a dc motor by armature voltage control
5. To obtain the running speed/torque characteristics of an induction motor.
6. To obtain the v-curves of a synchronous motor.
7. To obtain characteristic of SCR.
8. To study a UJT triggering of an SCR
9. To study commutation of an SCR by any commutation circuit.
10. Speed control of a single phases motor using TRIAC.
11. Organizing a chopper circuit using a power transistor.
12. Speed control of dc motor sing a phase controlled converter.
13. Speed control of dc motor using chopper.
14. Speed control of an induction motor using an inverter.