

Subject Name	L	T	P	Credit
Advance data structure and applications	2	1	2	4

Unit 1 :

Complexities, Time Complexity, order of Growth, Asymptotic Notation. Binary tree - definitions and properties, Representation, full and complete binary tree binary search tree. operations : create. insert, delete, traversals (preorder, inorder, postorder)

Graphs; Searching & Sorting: Introduction to Graphs: Representation, Adjacency Matrix and List, In degree, out degree of Graph, Graphs Operation, DFS & BFS, Spanning Tree, Shortest path. Searching and Sorting Methods: Various Searching and Sorting algorithms with complexity analysis.

Unit 2 :

Advanced Data Structures: Advanced Data Structures-Hash tables ,Heaps , Complexity , Analysis of Heap Operations , Application of Heap , AVL tree , Insertion & Deletion in AVL tree , Red Black Trees , Properties of Red Black trees ,Insertion & Deletion in Red Black tree.

Unit 3 :

Searching: Sequential Search, Binary Search, Comparison and Analysis.

Sorting: Sorting-Need for sorting , Types of sorting algorithm -Stable sorting Algorithm, Internal & External sorting algorithm , Outline and offline algorithm ,Sorting Techniques- Insertion , Shell , Selection , Merge ,Quick sort, Radix sort ,bucket sort, Heap Sort & their Time Complexities.

Unit 4 :

Augmenting Data structures:-Augmenting a red black trees, Retrieving an element with a given rank , Determining the rank of element ,Data structure Maintenance ,An augmentation strategy ,Interval Trees.

Unit 5 :

File structures: File structures-Basic file operations, File organization, Sequential file organization, Indexed sequential file organization, Direct file organization. External merge sort, Multiway Merge sort, Tournament Tree, Replacement Selection.

Text Books :

1. T.H. Cormen, "Introduction to algorithm", PHI.
2. Trembley and Sorenson, "Data Structures", TMH Publications
3. Pai, "Data structure and algorithm", TMH Publications.

Reference Books :

1. Horowitz and Sahani, "Fundamentals of data Structures", University Press.
2. Trembley and Sorenson, "Data Structures", TMH Publications.
3. A. M. Tenenbaum, "Data Structures using C & C++", Pearson Pub.
4. Venkatesan , Rose, "Data Structures" Wiley India Pvt.Ltd.
5. T.H.Coreman, "Introduction to algorithm", PHI.

Suggested list of experiments:

1. (a) Implementation of Linked List
1. (b) Implementation of Doubly Linked list.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Implementation of tree traversal.
4. Implementation of stack (infix to postfix conversion).
5. Implementation of Binary search Tree.
6. Implementation of insertion in AVL trees.
7. Implementation of hashing techniques.
8. Implementation of backtracking algorithm for knapsack problem.
9. Implementation of prim's and kruskal's algorithm.
10. Implementation of dijktra's algorithm using priority queues.
11. Implementation of array based circular queue.
12. Implementation of priority queues using heaps.
13. Implementation of branch and bound algorithm.
14. Implementation of Randomized algorithm.
15. Implementation of Topological sort on a Directed graph to decide is it is cyclic.

Subject Name	L	T	P	Credit
Object oriented programming in Java	2	1	2	4

Unit 1.

Introduction of Java

Why Java? , history of Java. The Java Environment – JVM, JDK & JRE. CLASSPATH, ,OOP Principles. Comparison of Java with C++. Features of Java Language, Variables, operators, constants, strings, input and output, Decision statements, Character String, String Manipulation. Loops, Array: One dimensional array, multi dimensional arrays.

Unit 2

Java as an object oriented language

Object & class fundamentals, creating and operating objects. Constructor and its types, access control, modifiers, Inner Class & anonymous classes, argument passing mechanism, method overloading, recursion. Static members, finalize () method, use of modifiers with classes & methods, this keyword, garbage collection.

Unit 3

Inheritance and Interface

Inheritance in classes, method overriding and dynamic method dispatch, abstract classes, using final with inheritance, Use of "super" keyword, type compatibility and conversion implementing Introduction interface Access, Multiple Inheritance, Interfaces and Abstract Classes, Inheritance within interfaces Packages : Creating packages, how to compile java package, access protection, importing packages

Unit 4

Exception Handling and Multithreading

Exceptions and handling exception, Compile time errors, Run time errors, try...catch: Using Multiple catch Blocks, finally Block, Throwing an Exception, Using the throw Statement, Using the throws Statement.

Introduction of Multithreading, Life Cycle of a Thread, creating Thread Scheduler, thread Priority Daemon Thread, Synchronization: Synchronized method, synchronized block static, Deadlock, Inter-thread Communication Interrupting Thread Stream.

Unit 5

GUI Programming

Introduction of Applet, Applet's Life Cycle, Applets vs applications, Security and applet, The Applet class and its parent classes, AWT Controls, basic of event handling , Action Listener interface, Panels ,Classes for various controls, such as label, choice, list Checkbox, etc. Dialogs and frames Using menus, Basic of Input and output stream.

Text Books:

1. Deitel & Deitel, "JAVA, How to Program", PHI
2. E. Balaguruswamy, "Programming In Java", TMH Publications
3. Herbert Schildt, " The Complete Reference" TMH
4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia

Suggested List of Experiments

1. Write a program to show Scope of Variables
2. Write a program to show Concept of CLASS and Object in JAVA
3. Write a program to show Type Casting in JAVA
4. Write a Program to show Inheritance.
5. Write a program to show Polymorphism.
6. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
7. Write a program to show use of constructor
8. Write a program to use abstract classes.
9. Write a program to Add a Class to a Package
10. Write a program to show Life Cycle of a Thread
11. Write a program to demonstrate AWT.
12. Write a program to demonstrate multithreading using Java.
13. Write a program to demonstrate applet life cycle.
14. Write a program to demonstrate event handling.
15. Make a project for record keeping of students data.

Subject Name	L	T	P	Credit
Data Communication	2	1	2	4

UNIT :-1

Introduction to data communication, Components, data representation, data flow and basic model, types of communication, applications of data communications.

Data Transmission: Time and frequency domain, Composite signals, Bandwidth, bit rate, bit length, Baseband and broadband transmission, Attenuation, distortion, noise, Nyquist bit rate, Shannon capacity, Throughout, delay, Jitter, Bandwidth delay product.

Parallel and serial transmission, synchronous, and asynchronous transmission, Simplex, half duplex and full duplex, unipolar and polar line codes, Non return to zero codes, return to zero codes, bipolar line codes, bauds , modem, Line configurations-Point to point and point to multipoint configuration.

UNIT:-2

Telephone Network-Network topology, signaling- SS7, dial-up modems, modem standard, digital subscriber line – ADSL,SDSL,VDSL. Multiplexing, Frequency division multiplexing, time division multiplexing and wavelength division multiplexing, pulse code modulation, pleisochronous digital hierarchy(PDH), synchronous digital hierarchy (SDH) ,STM -1 frame, virtual container, mapping of data signals on STM- 1.

UNIT:-3

Introduction to physical layer, Interface, Standards, EIA-232-D, RJ-45, RJ-11, BNC connector & EIA-449 digital Interface: Connection, specifications & configuration. Modem: Types, features, signal constellation, block schematic. Connecting Devices: Active and Passive Hubs, Repeaters, Bridges, Two & Three layer switches & Gateway. Network Topologies and their comparative study.

UNIT:-4

Transmission Media: Transmission line characteristics, distortions, Crosstalk.

Guided Media: Twisted Pair, Baseband & Broadband Coaxial. Optical Fibre: Physics and velocity of propagation of light, Advantages & Disadvantages, Block diagram ,Nodes and classification, Comparison, losses , light source and detectors , Construction,

Unguided media: Electromagnetic polarization, Rays and wavesfront, electromagnetic spectrum and radiation ,spherical wavefront and inverse square law, wave attenuation and absorption, optical properties of Radio waves .

UNIT:-5

Transmission Errors : Content Error, flow integrity error, methods of error control, Error detection, Error correction, Bit error rate, Viruses, worms, and hacking.

Error detection methods: Parity checking, Checksum Error Detection, Cyclic Redundancy Check, Hamming code, Interleaved codes, Block Parity, Convolution code, Hardware Implementation, Checksum .

Text Books

1. Stallings William , "Data & Computer Communication", Pearson Education
2. Forouzan, "Data communication and Networking", TATA Mc Graw Hill
3. Godbole A., "Data Communication & Network", TATA Mc Graw Hill

List of experiments

1. To study different types of transmission media.
2. To study pc to pc communication using parallel port.
3. To study LAN using star topology.
4. To study LAN using bus topology.
5. To study LAN using tree topology.
6. Case Study of digital interface RS-232
7. To study configure modem of computer
8. To configure hub/switch.
9. To study interconnections of cables for data communication.
10. To study fiber optic communication.
11. To study wireless communication.
12. To study pc-pc communication using LAN.

Subject Name	L	T	P	Credit
Advanced Web Programming with JQuery Ajax and web frameworks	2	0	4	4

UNIT-I

Java Script:- Introduction to Events and Functions, Handling Bugs, Logical Operators, Generating Random Numbers, The DOM - Basic Concepts, Node Relationships, Mouse Events, Adding Events Using JavaScript, More on Functions.

Front-end Web UI Frameworks: An Introduction to Bootstrap Bootstrap JavaScript Components Overview, Objectives and Outcomes, Responsive Design and Bootstrap Grid System.

UNIT-II

Bootstrap CSS Components: User Input, Bootstrap Buttons, Bootstrap Forms, Bootstrap Tables, Images and Media, Alerting Users.

UNIT-III

Bootstrap JavaScript Components:- Bootstrap JavaScript Components Overview, Tabs, Pills and Tabbed Navigation, Collapse, Accordion, Scrollspy and Affix, Tooltips, Popovers and Modals, Tooltips and Modals, Carousel.

UNIT-IV

Web Tools:- Introduction , Bootstrap and JQuery, Node.js and NPM, CSS Preprocessors: Less and Sass, Web Tools: Bower, Sever.

UNIT-V

Front-End JavaScript Frameworks: AngularJS Introduction, Frameworks, Angular Modules and Controllers, Models, Views and Controllers, Angular Filters, Task Runners, Angular Scope, Forms and Form Validation: Web Tools: Task Runners, Grunt, Gulp, Angular Scope, Angular Forms and Form Validation, Client-Server Communication.

References:-

1. Jeffrey C. Jackson, "Web Technologies- A computer science perspective", Pearson Education .
2. Jon Duckett, "Web Design with HTML, CSS, JavaScript and jQuery", Wiley

List of Experiments

1. Introduction to Java Script using HTML Code.
2. Write a JavaScript function that reverse a number.
3. Write a JavaScript function which will take an array of numbers stored and find the second lowest and second greatest numbers, respectively.
4. Implement navbar using Bootstrap.
5. Implement Bootstrap form (Tables, Images).
6. Implement Tab, Pills and Tabbed Navigation using Bootstrap and JavaScript.
7. Introduction to JQuery with bootstrap.
8. Build a responsive website.

Subject Name	L	T	P	Credit
Introduction To Engineering Mathematics With Applications– III	2	1	0	3

Fourier series and Fourier Transform

Introduction of Fourier series, Fourier series for Discontinuous functions, Euler's formula, Dirichlet's conditions, Fourier series for even and odd function, Half range series, Parseval's formula, Complex form of Fourier series. Introduction of Fourier Transform, Properties of Fourier Transform, Sine and Cosine Transform, Convolution and Parseval's formula for Fourier Transform.

Laplace Transform

Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, Second shifting property, Laplace Transform of the derivative, Inverse Laplace Transform & its properties, Convolution Theorem, Applications of L.T. to solve the ordinary differential equations.

Complex Variables

Analytic function, Harmonic Conjugate function, Cauchy-Riemann Equation, Line Integral, Cauchy's Theorem, Cauchy's Integral formula, Singular points, Poles & Residues, Residue Theorem, Application of Residues theorem for evaluation of real integrals.

Vector Calculus

Differentiation of Vectors, Scalar and Vector point function, Geometrical meaning of Gradient, Unit normal vector and Directional derivative, Physical interpretation of Divergence and Curl. Line integral, Surface integral and Volume integral, Green's Theorem, Stoke's Theorem and Gauss divergence Theorem.

Numerical Solution of Algebraic, Transcendental & Ordinary Differential Equations

Solution of Algebraic & Transcendental equations: Regula Falsi, Newton-Raphson, Iterative and Secant Method.

Solution of simultaneous linear equations: Gauss Elimination, Gauss Jordan, Jacobi's and Gauss-Siedel Iterative methods.

Solution of Ordinary Differential Equations: Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method.

Text/Reference Books

1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
2. Advance Engineering Mathematics by D.G.Guffy
3. Mathematics for Engineers by S. Arumungam, SCITECH Publication
4. Engineering Mathematics by S S Sastri P.H.I.
5. Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age International Publication

Subject Name	L	T	P	Credit
Discrete Structures	2	1	0	3

Set theory, relation, theorem proving techniques

Set Theory: Definition of sets, countable and uncountable sets, Venn Diagrams, proofs of some general identities on sets.

Relation: Definition, types of relation, composition of relations, Pictorial representation of relation, Equivalence relation, Partial ordering relation, Job-Scheduling problem.

Theorem proving Techniques: Mathematical induction, Proof by contradiction, Inclusion-Exclusion Principle in general.

Propositional calculus

Proposition, First order logic, Basic logical operation, truth tables, tautologies, Contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Normal Forms, Universal and existential quantifiers. Introduction to finite state machine Finite state machines as models of physical system equivalence machines.

Graph theory

Introduction and basic terminology of graphs, Planer graphs, Multigraphs and weighted graphs, Isomorphic graphs, Paths, Cycles and connectivity, Shortest path in weighted graph, Introduction to Eulerian paths and circuits, Hamiltonian paths and circuits, Graph coloring, chromatic number, Isomorphism and Homomorphism of graphs.

Algebraic structures

Definition, Properties, types: Semi Groups, Monoid, Groups, Abelian group, properties of groups, Subgroup, cyclic groups, Cosets, factor group, Permutation groups, Normal subgroup, Homomorphism and isomorphism of Groups, example and standard results.

Rings and Fields: definition and standard results.

Posets, lattices, recurrence relation and generating function

Posets and Lattices: Introduction, ordered set, Hasse diagram of partially, ordered set, isomorphic ordered set, well ordered set, properties of Lattices.

Recurrence Relation and Generating Function: Introduction to Recurrence Relation and Recursive algorithms, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions, Generating functions, Solution by method of generating functions.

Text/Reference Books

1. C.L.Liu, "Elements of Discrete Mathematics", Tata Mc Graw-Hill Edition.
2. Trembley, J.P & Manohar; "Discrete Mathematical Structure with Application CS", MH.
3. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill.
4. Lipschutz, "Discrete mathematics (Schaum)", TMH
5. Deo, Narsingh, "Graph Theory With application to Engineering and Computer.Science.", PHI.
6. Krishnamurthy V, "Combinatorics Theory & Application", East-West Pre. Pvt. Ltd., New Delhi.