



Syllabus for B.Tech(Electrical Engineering)

DATA STRUCTURE & ALGORITHM

EE-504A

Credit: 3

Contact: 3L

Module	Content	Hour
1	<p>Introduction:</p> <p>Importance of study of Data structure, Concept of data structure: Data and data structure, Abstract data type and data type. Algorithm and programs, Basic idea of pseudo-code, Algorithm efficiency and analysis, time and space analysis of algorithms-order notations.</p> <p>Different representation: row major, column major.</p> <p>Sparse matrix, its implementation and usage. Array representation of polynomials.</p> <p>Singly linked list, circular linked list, doubly linked list, linked list representation of polynomial and applications.</p>	08
2	<p>Stack & queue:</p> <p>Stack and its implementation, (using array, using linked list) application.</p> <p>Queues, circular queue, dequeue, Implementation of queue- both linear and circular (using array, using linked list) applications.</p> <p>Recursion:</p> <p>Principle of recursion- use of stack, difference between recursion and iteration, tail recursion. Application-The Tower of Hanoi, Eight Queen Puzzle.</p>	07
3	<p>Nonlinear data structure:</p> <p>Trees:</p> <p>Basic terminologies, forest, tree representation (using array, using linked list). Basic trees, binary tree traversal (Pre-,in-,post-order), threaded binary tree(left, right, full), non recursive traversal algorithm using threaded binary tree, expression tree. Binary search tree-operations (creation, insertion, deletion, searching), Height balanced binary tree-AVL tree (insertion, deletion with examples only). B tree operations ((insertion, deletion with examples only)</p> <p>Graph:</p> <p>Graph definition and concept, (directed/undirected graph, weighted/un-weighted edges, sub-graph, degree, cut vertex /articulation point, pendant node, clique, complete graph, connected –strongly connected component, weakly connected component-path, shortest path, isomorphism. Graph representation/storage implementation- adjacency matrix, adjacency list, adjacency multi-list.</p> <p>Graph traversal and connectivity- Depth First Search (DFS), Breadth-First Search (BFS), concept of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, and forward-edge, application.</p> <p>Minimal spanning tree-Prim's algorithm (Basic idea of greedy methods).</p>	15
4	<p>Searching, Sorting:</p> <p>Sorting algorithm, Bubble sort and optimization, insertion sort, shell sort, selection sort, merge sort, quick sort, heap sort (Concept, of max heap, application-priority queue, radix sort.</p> <p>Searching, sequential search, binary search, interpolation search.</p> <p>Hashing, Hashing functions, collision resolution techniques.</p>	10

Text Books:

1. Data structure using C, Reema Thareja, Oxford.
2. Data structure, S.Lipschutz. .
3. Data structure and program design in C, Robert L Krusse,

B.P.Leung Reference Books:

1. Data structure using C++, Varsha H. Patil, Oxford



B.P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY

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Department of Electrical Engineering

LESSON PLAN

Stream : B.Tech/EE-3rd Year

Subject : Data Structure & Algorithm

Subject Code : EE504A

AY: 2018-19

L.No	Description	Reference	Teaching Methodology	Teaching Aids
1	Importance of study of Data structure, Concept of data structure: Data and data structure, Abstract data type and data type.	T1, R1	Lecture/Discussion	Green board
2	Algorithm and programs, Basic idea of pseudo-code	T1, R2	Lecture, LMS	Green board
3	Algorithm efficiency and analysis, Time and space analysis of algorithms-order notations	T2, R2	Lecture/Discussion	Green board, PPT
4	Different representation: row major, column major. Sparse matrix, its implementation and usage	T1, R1	Lecture/Discussion	Green board
5	Array representation of polynomials. Introduction to Singly Linked List. Linked list representation of polynomial and applications.	T1, R2	Lecture, LMS	Green board PPT
6	Singly linked list- Insertion, Deletion, Traversal	T3, R2	Lecture, Role play	Green board, PPT
7	Circular linked list- Insertion, Deletion, Traversal	T1, R1	Lecture, Role play	Green board
8	Doubly linked list- Insertion, Deletion, Traversal	T1, R1	Lecture, TPS	Green board Smart phone
9	Stack and its implementation (Using array)	T1, R1	Lecture/Discussion	Green board
10	Stack and its implementation (Using linked list)	T1, R1	Lecture/Discussion	Green board
11	Queues, circular queue, dequeue	T1, R2	Lecture/Discussion , LMS	Green board PPT
12	Implementation of queue- both linear and circular (using array, using linked list) applications	T1, R1	Lecture/Discussion , TPS	Green board
13	Recursion: Principle of recursion- use of stack, difference between recursion and iteration, tail recursion	T1, R1	Lecture/Discussion , Tit for Tat	Green board
14	Recursion Application-The Tower of Hanoi	T1, R1	Lecture, LMS	Green board
15	Recursion Application-Eight Queen Puzzle	T1, R1	Lecture	Green board
16	Trees: Basic terminologies, forest, tree representation (using array, using linked list)	T1, R2	Lecture, LMS	Green board, PPT
17	Basic trees, binary tree traversal (Pre-,in-,post-order)	T1, R2	Lecture, LMS	Green board Smart phone
18	Threaded binary tree(left, right, full)	T1, R2	Lecture/Discussion	Green board
19	Nonrecursive traversal algorithm using threaded binary tree	T1, R2	Lecture/Discussion	Green board
20	Expression tree	T1, R2	Lecture/Discussion , LMS	Green board Smart phone
21	Binary search tree-operations (creation, insertion, deletion, searching)	T1, R2	Lecture/Discussion	Green board
22	Height balanced binary tree-AVL tree (insertion, deletion	T1, R2	Lecture/Discussion	Green board



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	with examples only)			PPT
23	B tree orations ((insertion, deletion with examples only)	T1, R1	Lecture/Discussion	Green board
24	Graph: Graph definition and concept, directed /undirected graph, weighted/un-weighted edges, sub-graph, degree, cut vertex /articulation point	T1, R1	Lecture/Discussion , LMS	Green board Smart phone
25	pendant node, clique, complete graph, connected –strongly connected component, weakly connected component-path, shortest path, isomorphism	T1, R1	Lecture/Discussion	Green board
26	Graph representation/storage implementation- adjacency matrix, adjacency list, adjacency multi-list	T1, R1	Lecture/Discussion	Green board
27	Graph traversal and connectivity- Depth First Search (DFS)	T1, R1	Lecture, LMS	Green board
28	Graph traversal and connectivity- Breadth-First Search (BFS)	T1, R1	Lecture/Discussion	Green board
29	Concept of edges used in DFS and BFS (tree-edge, back-edge, cross-edge, and forward-edge, application.	T1, R1	Lecture/Discussion	Green board
30	Minimal spanning tree-Prim's algorithm (Basic idea of greedy methods)	T1, R1	Lecture/Discussion , LMS	Green board Smart phone
31	Sorting algorithm, Bubble sort and optimization,	T1, R1	Lecture/Discussion	Green board
32	Shell sort, Selection sort, insertion sort	T1, R1	Lecture/Discussion	Green board
33	Merge sort	T1, R1	Lecture, LMS	Green board
34	Quick sort	T1, R1	Lecture/Discussion	Green board
35	Heap sort (Concept of max heap, application-priority queue	T1, R1	Lecture/Discussion	Green board
36	Radix sort	T1, R1	Lecture, LMS	Green board
37	Searching - Sequential search, binary search	T1, R1	Lecture/Discussion	Green board
38	Interpolation search	T1, R1	Lecture/Discussion	Green board
39	Hashing, Hashing functions	T1, R1	Lecture/Discussion	Green board
40	Collision resolution techniques	T1, R1	Lecture/Discussion	Green board

Text Books:

1. Data structure using C, Reema Thareja, Oxford.
2. Data structure, S. Lipschutz.
3. Data structure and program design in C, Robert L Krusse, B.P.Leung

Reference Books:1. Data structure using C++, Varsha H. Patil, Oxford

2. Data Structure & Algorithm, Dr. Arup Bhowmik, S Chand Publication

Prepared by: Subhadip Chandra



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Course Name: Data Structure & Algorithm

Code: EE 504A

Course Outcome:

S. No.	Description
EE 504A.1	Explain fundamental concept of Data Structure and ADT
EE 504A.2	Develop Algorithm for Linked list, Stack and Queue
EE 504A.3	Develop Algorithm for Graph and trees
EE 504A.4	Implements various Sorting algorithms
EE 504A.5	Implements various searching techniques and hashing

CO - PO - PSO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1					1			1		1
CO2	3	3	2	2					1			1		1
CO3	3	3	2	2					1			1		1
CO4	3	3	2	2					1			1		1
CO5	3	2	2	1					1			1		1



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Website: bppimt.ac.in

Department of Electrical Engineering

Course Name: Data Structure & Algorithm

Code: EE 504A

List of Bright Students

S. No.	Name of the Student
1	Suhasini Ramani
2	Soumyajit Mitra
3	Garima Bagaria
4	Dipesh Gupta
5	Akash Das