Govt. Polytechnic Hamirpur (H.P.)
LecturePlaning (theory)

Branch: **Computer Engg**　　　　　　　　　　　Semester: 4TH

Subject: **Data Structures & Algorithms**　　　　Session : Feb-June, 2024

Teacher: Sunil Kumar　　　　　　　　　　　　Classroom : CB LH-02/Smart Class Room

Sr. No.	No. of Lectures	Chapter/Unit Description	Detail of Contents	Reference/ Resource	Remarks
1	1-12	Unit-1: Introduction	Algorithms-Definition, Characteristics, Efficiency, Notations - Asymptotic, Big-Oh, Omega, Theta notation; Data Types, Data Structures - Characteristics, Types - Linear, Non-linear, General Operations, Efficiency;	R1,R2,R3	
2	13-28	Unit 2: Arrays, Structures and Pointers	Arrays, One-Dimensional and Multi-Dimensional Arrays, One-Dimensional Arrays-Memory Representation,Traversal, Insertion and Deletion, Sorting and Searching; Two-Dimensional Arrays–Memory Representation,Implement Matrices using Two-Dimensional Arrays, Matrix Operations-Addition, Subtraction, Multiplication, Transpose; Structure-Accessing structure members using (.) and (->) operators, self-referencing structures, Pointers-Dynamic Memory Allocation using malloc(), calloc(),free() and realloc(), Manipulate Arrays using Pointers	R1,R2,R3	
3	29-40	Unit 3: Sorting and Searching	Searching Techniques - Linear Search, Binary Search; Sorting Techniques – Selection Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort; Efficiencies of Sorting Algorithms.	R1,R2,R3	
4	41-52	Unit 4: Linear Data Structures	Linked Lists - Representation, Advantages, Disadvantages, Implementation, Operations; Doubly Linked List,Stacks, Stack Operations - Push, Pop; Implementation of Stack using Arrays and Linked List; Queues, Queue Operations, Implementation of Queue using Arrays and Linked List.	R1,R2,R3	
5	53-64	Unit-5 : Non-Linear Data Structures	Trees, Tree Terminology - Node, Root, Parent, Children, Sibling, Edge, Leaves; Binary Tree, Binary Tree Representation, Binary Tree Traversal, Binary Search Tree, Graphs, Graph Terminology, Directed Graphs, Weighted Graphs, Graph Implementation using Adjacency Matrix and Adjacency List.	R1,R2,R3	

References:
R1 : Self made Power Point Presentation (animated)
R2 : Data Structures and Algorithms: Concepts, Techniques and Applications, G. A. V. Pai, McGraw-Hill Education, In
R3: Lab Mannual, Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi

Course outcome :
CO-1. Understand the basic terms associated with data structures and algorithms.
CO-2. Select appropriate data structures to efficiently store and process data
CO-3. Write efficient algorithms for given problems
CO-4. Analyze the performance of various general algorithms.

27|01|2024

Signature of teacher with date

HOD

Govt. Polytechnic Hamirpur (H.P.)
Lecture Planing (Practical)

Branch: **Computer Engg**

Subject: **Data Structures & Algorithms**

Teacher: Sunil Kumar

Semester: 4TH

Session : Feb-June, 2024

Lab Name : OSL

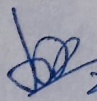| Sr. No.	No. of Practical Hours planned	Aim of Practical	Reference for procedure/ writeup	Remarks
1	04	To insert and delete elements at specified location in an array.	R1,R2,R3	
2	04	To search an element in an array using linear search.	R1,R2,R3	
3	04	To search an element in a sorted array using binary search	R1,R2,R3	
4	04	To sort elements of a given array in ascending order using selection sort method.	R1,R2,R3	
5	04	To sort elements of a given array in ascending order using bubble sort method	R1,R2,R3	
6	04	To sort elements of a given array in ascending order using quick sort method	R1,R2,R3	
7	04	To sort elements of a given array in descending order using insertion sort technique	R1,R2,R3	
8	04	To sort elements of a given array in descending order using merge sort technique.	R1,R2,R3	
9	04	To implement a stack and demonstrate push, pop and peek operations on it	R1,R2,R3	
10	04	To implement a queue and demonstrate various operations on it	R1,R2,R3	
11	04	To implement a circular-queue and demonstrate various operations on it.	R1,R2,R3	
12	06	To implement a linked list and demonstrate insertion, deletion and traversing operations on it	R1,R2,R3	
13	04	To implement a doubly linked list and demonstrate insertion, deletion and traversing operations.	R1,R2,R3	
14	04	To implement a tree and perform in-order, pre-order and post-order traversals.	R1,R2,R3	
15	06	To implement a binary search tree and perform insertion, deletion and search operations on it.	R1,R2,R3	

References:

R1 : Self made Power Point Presentation (animated)

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R3: Lab Mannual, Data Structures, R.S. Salaria, Khanna Book Publishing, New Delhi

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