	DPG Institute of Technology and Management
	Sector 34, Gurugram HR 122004
	Lesson Plan
	Course Name: Data Structure & Algorithms
	Faculty Name: Ms. Arpita Mendiratta

No. of Lecture Hours/Week	3	**Exam Hours**	3
Total No. of Lecture Hours		**Exam Marks**	75
Course Code:	PCC-CSE-203G	**Semester**	5

COURSE OBJECTIVES:

1. Analyze the algorithms to determine the time and computation complexity and justify the correctness.
2. Implement given search problem (linear search and binary search)
3. Implement given problem of Stacks, Queues and linked list and analyze the same to determine the time and computation complexity.
4. Implement Graph search and traversal algorithms and determine the time and computation complexity.

S. No	Topics to be covered	Teaching Methodology	Class Activity/Event	Remark/ CO
SECTION A	**Unit 1**			
1	Basic Terminologies: concept of data structure, choice of right data structure	Chalk &Talk	Group discussion on data structures.	CO1
2	Types of Data Structure	PPT	Class Discussion	CO1
3	Need of DS	PPT	Applications discussion	CO1
4	Algorithm and its characteristics	Chalk &Talk	Discussion of algorithms	CO1
5	Analysis of algorithm	Chalk &Talk	Brainstorming challenges with different types of algorithms	CO1

6	Complexity, Asymptotic notation	Chalk &Talk	Examples demonstration	CO1
7	Big O notation, Linear search	PPT	Analyse Big O notation.	CO2
8	Binary search and its algorithm	Chalk &Talk	Algorithm of binary search	CO2
9	Example of binary search	Chalk &Talk	Execute example of search	CO2
10	Iterative and recursive search	PPT	Analyzing efficiency	CO2
SECTION B	**Unit 2**			
11	Introduction to stack	PPT	Practical Application of stack.	CO3
12	Infix to Postfix Expression	Chalk &Talk	Example	CO3
13	Infix to Prefix Expression	Chalk &Talk	Example	CO3
14	Evaluation of Expression	Chalk &Talk	Evaluation	CO3
15	Prefix to Infix, Postfix Postfix to Infix	Chalk &Talk	Practical on stack	CO3
16	Simple Queue	PPT	Application	CO3
17	Circular Queue	Chalk &Talk	Usage	CO3
18	Priority Queue	Chalk &Talk	Case-based exercises.	CO3
19	Revision Unit-1	Chalk &Talk	Quiz and collaborative Q&A.	CO1
20	Revision Unit-2	Chalk &Talk	Quiz and collaborative Q&A.	CO3
21	Oral Assessment	Question Answer	Quiz and collaborative Q&A.	
22	Sessional 1	Written exam	Exam	
SECTION C	**. Unit 3**			
23	Linked List	Chalk &Talk	Use of linked list	CO3

24	Traversal, Insertion in Linked List	Chalk &Talk	Perform various operations on linked list	CO3
25	Creation Algorithm	Chalk &Talk	Algorithm analysis	CO3
26	Deletion and Searching Algorithm	PPT	Algorithm analysis	CO3
27	Doubly linked list(Insertion, Deletion)	Chalk &Talk	Perform various operations	CO3
28	Circular linked list(Insertion, Deletion)	Chalk &Talk	Perform various operations	CO3
29	Stack and Queue as Linked List	Chalk &Talk	Compare different types of linked list	CO3
30	Tree, Binary Tree	Chalk &Talk	Diagram of tree data structure	CO4
31	Types of Trees	PPT	Practical of Tree data structure	CO4
32	Binary search tree construction	PPT	Numerical on Binary Search tree	CO4
33	Tree Traversal	PPT	Traversal of tree	CO4
SECTION D	Unit 4			
34	Bubble, Selection and Insertion sorting	Chalk &Talk	Understanding use of sorting	CO4
35	Quick, Merge and Heap sort	Chalk &Talk	Numerical	CO4
36	Graph Terminologies	PPT	Classwork on graph components	CO5
37	Graph search	Chalk &Talk	Analysing graph for traffic network management	CO5
38	Prim's and Kruskal Algorithm	Chalk &Talk	Finding minimum spanning tree	CO5
39	Revision	Chalk &Talk	Conduct quiz and review	

Assessment Methods: -

S.No.	Evaluation Component	Assessment Method	Marks
1	Internal Marks		25
		Attendance	5
2		Quiz/Presentation	5
3		Assignment	5
4		Avg of Sessional 1&2	10
5	External Marks	Final University Exam	75

Suggested Textbook:

- "Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

Suggested reference books:

- Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company

- "How to Solve it by Computer", 2nd Impression by R.G. Dromey, Pearson Education.

Course Outcome:

At the end of this course, students will demonstrate the ability to:

C01 Analyze the algorithms to determine the time and computation complexity and justify the correctness.

CO.2 Implement given search problem (linear search and binary search).

CO.3 Implement given problem of Stacks, Queues and linked list and analyze the same to determine the time and computation complexity.

CO.4 Write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.

CO.5 Implement Graph search and traversal algorithms and determine the time and computation complexity.

Signature of Staff In-charge   Signature of HOD