SANATAN DHARMA COLLEGE, AMBALA CANTT

College with Potential for Excellence, UGC,New Delhi
NAAC Accredited Grade "A+" with CGPA 3.51 in 3rd cycle
ISO 9001:2015 & ISO 14001:2015 Certified

Department of Computer Science

Lesson Plan (Session 2022-2023)

Class: B.VOC (SD) Sem: III **Course Code: BVSD-32**

Duration: 16 Weeks **Date : September-December 2022**

SYLLABUS

Nomenclature: Data Structure

Maximum Marks: 100 **External: 80** **Minimum Pass Marks: 40**
Internal: 20 **Time: 3 hours**

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of objective type/short-answer type questions covering the entire syllabus. In addition to that, eight more questions will be set, two questions from each Unit. Student will be required to attempt FIVE questions in all. Question Number 1 will be compulsory. In addition to compulsory question, student will have to attempt four more questions selecting one question from each Unit.

UNIT-I

Introduction to Data Structures: Elementary Data Organization, Data Structure Operations, Algorithm Complexity and Time-space Tradeoff, Classification of Data Structures.
String Processing: Storing Strings, String Operations, Pattern Matching Algorithms.
Arrays: Linear Arrays, Operations on Arrays, Multidimensional Arrays, Storage of Arrays, Matrices, Sparse Matrices.

Unit II

Linked Lists: Representation of Linked List in Memory, Traversal, Searching, Insertion, Deletion, Sorted Linked List, Header List, Two–way List.
Stacks, Queues, Linked and Array Representation of Stacks, Queues, and Dequeues, Priority Queues, Operations on Stacks and Queues.

Unit III

Applications of Stacks: Recursion, Polish Notation, Quick Sort.
Trees: Binary Trees, Representation of Binary Trees in Memory, Threaded Binary Trees, Balanced Tree, Different Tree Traversal Algorithms, Binary Search Tree: Searching, Insertion, and Deletion in a Binary Search Tree, Heap Sort.

Unit IV

Representation of Graphs and Applications: Adjacency Matrix, Path Matrix, Shortest Path Algorithm, Linked Representation of a Graph, Traversing a Graph.
Sorting and Searching: Linear Search, Binary Search, Insertion Sort, Selection Sort, Bubble Sort, Radix Sort, Merge Sort.

TEXT BOOKS:

- Lipschutz Seymour, Data Structures, Tata Mc Graw Hill Publishing Company Limited, Schaum's Outlines, New Delhi, 1986
- Langsam Yedidyan, Augenstein Moshe J. and Tanenbaum Aaron M., Data Structures using C, Prentice Hall of India Pvt. Ltd., New Delhi, 2009

REFERENCE BOOKS:

- Terembley J.P. and Sorenson P.G., An Introduction to Data Structures with Applications, Mc-Graw Hill, International Student Edition, New York, 1988
- Weiss Mark Allen, Data Structures and Algorithm Analysis in C, Addison Wesley (An Imprint of Pearson Education), Mexico City, Prentice Hall of India Pvt. Ltd., New Delhi

Course Outcomes

After the completion of this course, prospective Computer professionals will have the ability to

Course Title	Programming Fundamentals and C
CO No.	**Course Outcomes**
CO-1	**Understand the fundamentals of Data Structures and basic concepts of String Processing,Linear Arrays, Records and Pointers.**
CO-2	**Analyze the representation of Linked Lists in memory, Stack, Queues and implement realtime applications in Stack and Queues.**
CO-3	**Explore the structure of Trees, basic operations of Trees, analyze and illustrate thealgorithms.**
CO-4	**Apply data structures and algorithms in real time applications.**
CO-5	**Analyze the various algorithm design and implementation.**
CO-6	**Develop solutions using advanced algorithms for various kinds of problems.**

S.No	Instructional Technique	Assessment Methods (AM)
1	Chalk & Talk	**Assignments**
2	ICT tools	**Quiz**
3	Group discussions	**Group Discussions**
4	Industrial visit	**Oral Tests**
5	Case studies	**Sessional**
6	Small Projects	**Presentations**
7	Workshop	**Seminar**
8	Spoken Tutorials	**University Exams**
9	Flipped Class	
10.	**E-Resources**	

Detailed Lesson Plan

Week	Date	Topic to be Covered	Instructional Technique	Assessment Method
1	01.09.2022		1-(PPT/Projector)	1
	02.09.2022	Introduction to Data Structures: Elementary Data Organization	2-(PPT/Projector)	1,2,4
	03.09.2022	Data Structure Operations	2-(PPT/Projector)	1,2,3
2	08.09.2022	Algorithm Complexity	2-(PPT/Projector)	1,2,3
	09.09.2022	Time-space Tradeoff	2-(PPT/Projector	1,2,4
	10.09.2022	Classification of Data Structures	2-(PPT/Projector)	1,2,3
3	15.09.2022	String Processing: Storing Strings, String Operations,	2-(PPT/Projector)	1,2,3
	16.09.2022	Pattern Matching Algorithms	2-(PPT/Projector)	1,2,3
	17.09.2022	Arrays: Linear Arrays, Operations on Arrays	2-(PPT/Projector)	1,2,4
4	22.09.2022	Multidimensional Arrays, Storage of Arrays, Algorithms	2-(PPT/Projector)	1,2,3,4
	23.09.2022	**Holiday**	----------	----------
	24.09.2022	Sparse Matrices	2-(PPT/Projector)	1,2,3,4
5	29.09.2022	Linked Lists: Representation of Linked List in Memory	2-(PPT/Projector)	1,2,3,4
	30.09.2022	Traversal, Searching in Linked List	2-(PPT/Projector)	1,2,3,4
	01.10.2022	Insertion in Linked List	2-(PPT/Projector)	1,2,3,4
6	06.10.2022	Deletion in in Linked List	1- Chalk & Talk	1,2,3
	07.10.2022	Sorted Linked List, Header List	1-Chalk & Talk	1,2,3
	08.10.2022	Two–way List	1-Chalk & Talk	1,2,3
7	13.10.2022	Stacks, Linked and Array Representation of Stacks	1,2-(PPT/Projector)	1,2,3,4
	14.10.2022	Operations on Stacks	2-(PPT/Projector)	1,2,3,4
	15.10.2022	Applications of Stacks: Recursion	2-(PPT/Projector)	1,2,3,4
8	20.10.2022	Applications of Stacks: Polish Notation	1,2-(PPT/Projector)	1,2,3,4
	21.10.2022	Applications of Stacks: Polish Notation	1-Chalk & Talk	1,2,3
	22.10.2022	Diwali Vacation	----------	----------
9	27.10.2022	Quick Sort.	1-Chalk & Talk	1,2,3
	28.10.2022	Linked and Array Representation of Queues	1,2-(PPT/Projector)	1,2,3,4

Week	Date	Topic to be Covered	Instructional Technique	Assessment Method
	29.10.2022	Queues, and Dequeues, Priority Queues	1,2-(PPT/Projector)	1,2,3,4
10	03.11.2022	Operations on Queues	1,2-(PPT/Projector)	1,2,3,4
	04.11.2022	Priority Queue	1,2-(PPT/Projector)	1,2,3,4
	05.11.2022	**Assignment 1**	----------	1
11	10.11.2022	Trees Terminology	1,2-(PPT/Projector)	1,2,3,4
	11.11.2022	Binary Tree ,Representation of Binary Trees in Memory	1,2-(PPT/Projector)	1,2,3,4
	12.11.2022	Threaded Binary Trees	1,2-(PPT/Projector)	1,2,3,4
12	17.11.2022	**Sessional**	----------	5
	18.11.2022	Balanced Tree	1,2-(PPT/Projector)	1,2,3,4
	19.11.2022	Tree Traversal Algorithms :preorder	1,2-(PPT/Projector)	1,2,3,4
13	24.11.2022	Tree Traversal Algorithms :postorder,inorder	1,2-(PPT/Projector)	1,2,3,4
	25.11.2022	Binary Search Tree: Searching	1, 2-(PPT/Projector	1,2,3,4
	26.11.2022	**Holiday**	----------	----------
14	01.12.2022	Insertion, and Deletion in a Binary Search Tree	1, 2-(PPT/Projector	1,2,3,4
	02.12.2022	Heap Sort	2-(PPT/Projector	1,2,3,4
	03.12.2022	**Assignment 2**	----------	1
15	08.12.2022	Representation of Graphs and Applications	2-(PPT/Projector	1,2,3,4
	09.12.2022	Adjacency Matrix, Path Matrix	2-(PPT/Projector	1,2,3,4
	10.12.2022	Linked Representation of a Graph	2-(PPT/Projector	1,2,3,4
16	15.12.2022	Traversing a Graph	2-(PPT/Projector	1,2,3,4
	16.12.2022	Shortest Path Algorithm	2-(PPT/Projector	1,2,3,4
	17.12.2022	Sorting and Searching: Linear Search	2-(PPT/Projector	1,2,3,4
17	22.12.2022	Binary Search	2-(PPT/Projector	1,2,3,4
	23.12.2022	Bubble Sort, Selection Sort	2-(PPT/Projector	1,2,3,4
	24.12.2022	Insertion Sort	2-(PPT/Projector	1,2,3,4

	Teacher Incharge	**Head of the Department**
Name	Dr. Poonam Rani	Dr. Girdhar Gopal
Sign with Date		