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

DCSA-SDC
Modelling Excellence

Department of Computer Science
Lesson Plan (Session 2021-2022)

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

Duration: 17 Weeks   **Date: Oct-Feb 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	11.10.21		1-(PPT/Projector)	1
	12.10.21	Introduction to Data Structures: Elementary Data Organization	2-(PPT/Projector)	1,2,4
	13.10.21	Data Structure Operations	2-(PPT/Projector)	1,2,3
2	18.10.21	Algorithm Complexity	2-(PPT/Projector)	1,2,3
	19.10.21	Time-space Tradeoff	2-(PPT/Projector	1,2,4
	20.10.21	Classification of Data Structures	2-(PPT/Projector)	1,2,3
3	25.10.21	String Processing: Storing Strings, String Operations,	2-(PPT/Projector)	1,2,3
	26.10.21	Pattern Matching Algorithms	2-(PPT/Projector)	1,2,3
	27.10.21	Arrays: Linear Arrays, Operations on Arrays	2-(PPT/Projector)	1,2,4
4	1.11.21	Multidimensional Arrays, Storage of Arrays, Algorithms	2-(PPT/Projector)	1,2,3,4
	2.11.21	**Holiday**	------------------	------------------
	3.11.21	Sparse Matrices	2-(PPT/Projector)	1,2,3,4
5	8.11.21	Linked Lists: Representation of Linked List in Memory	2-(PPT/Projector)	1,2,3,4
	9.11.21	Traversal, Searching in Linked List	2-(PPT/Projector)	1,2,3,4
	10.11.21	Insertion in Linked List	2-(PPT/Projector)	1,2,3,4
6	15.11.21	Deletion in in Linked List	1- Chalk & Talk	1,2,3
	16.11.21	Sorted Linked List, Header List	1-Chalk & Talk	1,2,3
	17.11.21	Two–way List	1-Chalk & Talk	1,2,3
7	22.11.21	Stacks, Linked and Array Representation of Stacks	1,2-(PPT/Projector)	1,2,3,4
	23.11.21	Operations on Stacks	2-(PPT/Projector)	1,2,3,4
	24.11.21	Applications of Stacks: Recursion	2-(PPT/Projector)	1,2,3,4
8	29.11.21	Applications of Stacks: Polish Notation	1,2-(PPT/Projector)	1,2,3,4
	30.11.21	Applications of Stacks: Polish Notation	1-Chalk & Talk	1,2,3
	1.12.21	Diwali Vacation	------------------	------------------
9	6.12.21	Quick Sort.	1-Chalk & Talk	1,2,3
	7.12.21	Linked and Array Representation of Queues	1,2-(PPT/Projector)	1,2,3,4

Week	Date	Topic to be Covered	Instructional Technique	Assessment Method
	8.12.21	Queues, and Dequeues, Priority Queues	1,2-(PPT/Projector)	1,2,3,4
10	13.12.21	Operations on Queues	1,2-(PPT/Projector)	1,2,3,4
	14.12.21	Priority Queue	1,2-(PPT/Projector)	1,2,3,4
	15.12.21	**Assignment 1**	-------------------	1
11	20.12.21	Trees Terminology	1,2-(PPT/Projector)	1,2,3,4
	21.12.21	Binary Tree ,Representation of Binary Trees in Memory	1,2-(PPT/Projector)	1,2,3,4
	22.12.21	Threaded Binary Trees	1,2-(PPT/Projector)	1,2,3,4
12	27.12.21	**Sessional**	-------------------	5
	28.12.21	Balanced Tree	1,2-(PPT/Projector)	1,2,3,4
	29.12.21	Tree Traversal Algorithms :preorder	1,2-(PPT/Projector)	1,2,3,4
13	3.1.22	Tree Traversal Algorithms :postorder,inorder	1,2-(PPT/Projector)	1,2,3,4
	4.1.22	Binary Search Tree: Searching	1, 2-(PPT/Projector	1,2,3,4
	5.1.22	**Holiday**	-------------------	-------------------
14	10.1.22	Insertion, and Deletion in a Binary Search Tree	1, 2-(PPT/Projector	1,2,3,4
	11.1.22	Heap Sort	2-(PPT/Projector	1,2,3,4
	12.1.22	**Assignment 2**	-------------------	1
15	17.1.22	Representation of Graphs and Applications	2-(PPT/Projector	1,2,3,4
	18.1.22	Adjacency Matrix, Path Matrix	2-(PPT/Projector	1,2,3,4
	19.1.22	Linked Representation of a Graph	2-(PPT/Projector	1,2,3,4
16	24.1.22	Traversing a Graph	2-(PPT/Projector	1,2,3,4
	25.1.22	Shortest Path Algorithm	2-(PPT/Projector	1,2,3,4
	26.1.22	Sorting and Searching: Linear Search	2-(PPT/Projector	1,2,3,4
17	31.1.22	Binary Search	2-(PPT/Projector	1,2,3,4
	1.2.22	Bubble Sort, Selection Sort	2-(PPT/Projector	1,2,3,4
	2.2.22	Insertion Sort	2-(PPT/Projector	1,2,3,4