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 2021-2022)

Class: BCA SEM: III Sec-A & B Course Code: BCA-232 Nomenclature: Data Structures

Duration: 16 Weeks **Dates: Oct-Jan, 2022**

SYLLABUS

BCA-232 Data Structure

Maximum Marks: 100 **External: 80** **Minimum Pass Marks: 35**
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: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.
Strings: Introduction, String strings, String operations, Pattern matching algorithms.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparce matrics.
Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Garbage collection, Applications of linked lists. Algorithms for Insertion, deletion in array, Single linked list

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.
Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks and using recursion.
Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz,Sahni& Anderson-Freed, "Fundamentals of Data Structures in C", University Press

REFERENCE BOOKS:

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw-Hill International Student Edition, New York.

2. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City

Course Outcomes

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

Semester-III BCA – 232 DATA STRUCTURES At the end of course student should be able to:	
CO-1	Identify applications and categories of Data Structure
CO-2	Understand and explain Algorithms complexity and time-space tradeoff, Big-O notation
CO-3	Applying String operations, Pattern matching algorithms
CO-4	Identify the appropriate data structures and algorithms for solving real world problems
CO-5	Applying various kinds of searching and sorting techniques
CO-6	Understanding and implementing algorithms using various data structures like Arrays, stacks, queues, Deques, Priority Queues, linked list, trees, graphs.
CO-7	Understanding and implementing applications of all data structures studies in due course.

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 Sec-B

Week	Date	Topic to be covered	Instructional Technique	Assessment Method
1	11.10.21	**Introduction: Elementary data organization**	**1**	**----**
	12.10.21	**Introduction: Elementary data organization**	**2(PPT/Projector)**	**1**
	13.10.21	**Data type vs. data structure**	**1**	**1**
2	18.10.21	Categories of data structures	**1**	**1,2,3,4**
	19.10.21	Data structure operations, Applications of data structures	**1**	**1,2,3,4**
	20.10.21	**Algorithms complexity and time-space tradeoff**	**2-(PPT/Projector)**	**1,2,3,4,6**
3	25.10.21	Big-O notation. Strings: Introduction	**2-(PPT/Projector)**	**1,2,3,4**
	26.10.21	String operations	**1**	**1,2,3,4**
	27.10.21	**Pattern matching algorithms**	**2-(PPT/Projector)**	**1,2,3,4**
4	1.11.21	**Holiday**	**--**	**---**
	2.11.21	**Arrays: Introduction**	**2-(PPT/Projector)**	**1,2,3,4,5**
	3.11.21	**Representation of linear array in memory**	**2-(PPT/Projector)**	**2,3,4**
5	8.11.21	**Assignment -1**	**9**	**1,2,3,4**
	9.11.21	Array Traversal	**2-(PPT/Projector)**	**1,2,3,4**
	10.11.21	**Insertions, Deletion in an array, Multidimensional arrays**	**2-(PPT/Projector)**	**1,2,3,4**
6	15.11.21	Parallel arrays, Sparce matrics.	**---**	**6**
	16.11.21	**Linked List: Introduction, Array vs. linked list**	**9**	**1,2,3,4,6**
	17.11.21	**Representation of linked lists in memory**	**8,10,2**	**1,2,3,4,**
7	22.11.21	**Representation of linked lists in memory**	**8,10,2**	**1,2,3,4,**
	23.11.21	**Circular linked list, Two-way linked list, Garbage collection**	**6**	**1,2,3,4**
	24.11.21	Applications of linked lists.	**6**	**1,2,3,4**
8	29.11.21	**Diwali Vaccation**	**--**	**--**
	30.11.21	Stack: Introduction .	**2-(PPT/Projector)**	**1,2,3,4**

	1.12.21	**Holiday**		
9	6.12.21	**Array and linked representation**	**2-(PPT/Projector)**	**1,2,3,4**
	7.12.21	**Operations on stacks, Applications of stacks**	**2-(PPT/Projector)**	**1,2,3,4**
	8.12.21	**Holiday**		
10	13.12.21	**Polish notation, Recursion**	**2-(PPT/Projector)**	**1,2**
	14.12.21	**Queues: Introduction**	**2-(PPT/Projector)**	**1,2,3,4**
	15.12.21	**Array and linked representation of queues**	**6**	**1,2,3,4**
11	20.12.21	Operations on queues, Deques,	**6**	**1,2,3,4**
	21.12.21	Sessional	**--**	**5**
	22.12.21	**Priority Queues, Applications**	**2-(PPT/Projector)**	**1,2,3,4**
12	27.12.21	**Tree: Introduction**	**2-(PPT/Projector)**	**1,2,3,4**
	28.12.21	**Assignment-2**	**6**	**1,2,3,4**
	29.12.21	Tree: Introduction, Definition	**2-(PPT/Projector)**	**1,2,3,4**
13	3.1.22	**Representing Binary tree in memory**	**6**	**1,2,3,4**
	4.1.22	Traversing binary trees	**2-(PPT/Projector)**	**1,2,3,4**
	5.1.22	Traversal algorithms using stacks	**9,10**	**1,2,3,4**
14	10.1.22	Traversal algorithms using recursion	**9,10**	**1,2,3,4**
	11.1.22	**Graph: Introduction**	**2-(PPT/Projector)**	**1,2,3,4**
	12.1.22	Graph theory terminology	**2-(PPT/Projector)**	**1,2,3,4**
15	17.1.22	Sequential representation of graphs	**6**	**1,2,4**
	18.1.22	Linked representation of graphs.	**6**	**1,2,3,4**
	19.1.22	Revision	**2-(PPT/Projector)**	**1,3,4**
16	24.1.22	Revision	**6**	**1,2,3,4**
	25.1.22	**-**	**--**	**--**
	26.1.22	**-**	**--**	**--**

Detailed Lesson Plan Sec A

Week	Date	Topic to be Covered	Instructional Technique	Assessment Method
1	11.10.21	**Introduction: Elementary data organization**	**2-(PPT/Projector)**	**----**
	12.10.21	**Elementary data organization, Data Structure definition**	**1**	**1**
	13.10.21	**Data type vs. data structure**	**1**	**1**
2	18.10.21	**Categories of data structures**	**1**	**1,2,3,4**
	19.10.21	Data structure operations, Applications of data structures	**1**	**1,2,3**
	20.10.21	**Algorithms complexity and time-space tradeoff**	**2-(PPT/Projector)**	**1,2,3,4**
3	25.10.21	Big-O notation. Strings: Introduction	**2-(PPT/Projector)**	**1,2**
	26.10.21	Holiday	1	1,2,3,4
	27.10.21	**String operations.**	2-(PPT/Projector)	1,2,3,4
4	1.11.21	**Pattern matching algorithms.**		
	2.11.21	**Arrays: Introduction**	2-(PPT/Projector)	1,2,3,4
	3.11.21	**Representation of linear array in memory**	2-(PPT/Projector)	1,2,3,4
5	8.11.21	Assignment -1	9	1,2,3,4
	9.11.21	Array Traversal	2-(PPT/Projector)	1,2,3,4
	10.11.21	**Insertions, Deletion in an array, Multidimensional arrays**	2-(PPT/Projector)	1,3,4
6	15.11.21	Holiday		
	16.11.21	Parallel arrays, Sparce matrics	---	6
	17.11.21	**Linked List: Introduction, Array vs. linked list**	9	1,2,3,4,6
7	22.11.21	**Representation of linked lists in memory**	8,10,2	1,4,
	23.11.21	**Insertion, Deletion, Searching in a linked list, Header linked list**	8,10,2	1,2,3,4,
	24.11.21	Diwali Vaccation		
8	29.11.21	**Circular linked list, Two-way linked list, Garbage collection**	6	1,2,3,4
	30.11.21	**Applications of linked lists.**	6	1,2,3,4

	1.12.21	Algorithms for Insertion, deletion in array, Single linked list.	2-(PPT/Projector)	1,2,3,4
9	6.12.21	**Stack: Introduction**	2-(PPT/Projector)	1,2,3,4
	7.12.21	Holiday		
	8.12.21	Array and linked representation of stacks	2-(PPT/Projector)	1,2,3,4
10	13.12.21	**Operations on stacks, Applications of stacks**	2-(PPT/Projector)	1,2,3,4
	14.12.21	Holiday		
	15.12.21	**Polish notation, Recursion**	2-(PPT/Projector)	1,2,3,4
11	20.12.21	Assignment-2	6	1,2,3,4
	21.12.21	**Queues: Introduction**	6	1,2,3,4
	22.12.21	Array and linked representation of queues	--	5
12	27.12.21	**Operations on queues, Deques**	2-(PPT/Projector)	1,2,3,4
	28.12.21	Sessional	2-(PPT/Projector)	1,2,3,4
	29.12.21	**Priority Queues, Applications of queues**	6	1,3,4
13	3.1.22	**Tree: Introduction, Definition**	2-(PPT/Projector)	1,2,3,4
	4.1.22	**Representing Binary tree in memory**	6	1,2,3,4
	5.1.22	**Traversing binary trees**	2-(PPT/Projector)	1,2,3,4
14	10.1.22	Traversal algorithms using stacks	9,10	1,2,3,4
	11.1.22	Traversal algorithms using recursion	9,10	1,2,3,4
	12.1.22	**Graph: Introduction**	2-(PPT/Projector)	1,2,3,4,5
15	17.1.22	**Graph theory terminology**	2-(PPT/Projector)	1,2,3,4
	18.1.22	**Sequential representation of graphs**	6	1,2,3,4
	19.1.22	**Linked representation of graphs.**	6	1,2,3,4
16	24.1.22	Revision	2-(PPT/Projector)	1,2,3,4
	25.1.22	Revision	6	1,2,3,4
	26.1.22	**Revision**	--	--