Mangalmay Institute of Management Technology
Greater Noida (U.P.)

Lesson Plan

Program: BCA **Semester:** III **Course Code**: BCA-302 **Course Name:** Data Structure using C & C++

Course Objectives

(CO1): To learn the concepts of Array and its types.

(CO2): To learn the concepts of stack and queues.

(CO3): To learn the use of list and its operations.

(CO4): To learn the concepts of trees and its implementation.

(CO5): Understand and implement the concept of advanced data structure of B-trees.

(CO6): Implement appropriate sorting/searching technique for given problem.

Session Duration: 60 minutes
Participants: BCA Third Semester Students

Entry level knowledge and skills of students

i. Basic Knowledge of C.

Equipment required in Classroom/ Laboratory/ Workshop

i. Projector
ii. White Board

Assessment Schemes

S. No.	Criteria	Marks (100)
1	CCSU End Term Examination	75
2	Internal Evaluation Scheme	25
2(a)	Teacher Assessment (Continuous Evaluation) (Assignment & Attendance)	25
2(a)(i)	Assignment -1	10
2(a)(ii)	Assignment -2	10
2(a)(iii)	Attendance (compulsory)	5

Course Outcomes (starting with action-oriented observable and measurable verb)

(CO1): Able to define array and its types. **(Understand K(2), Applying(K3))**

(CO2): Able to define the concepts of stack and queues. **(Understand K (2), Applying(K3)).**

(CO3): Able to understand the concept and implement the list and its operations. **(Understand K (2),Applying(K3))**

(CO4): Able to understand the concept and implement the trees and its operations. **(Understand K(2),Applying(K3))**

(CO5): Able to understand and implement the concept of advanced data structure of B-trees. **(Understand K (2),Applying(K3))**

(CO6): Able to implement appropriate sorting/searching technique for given problem. **(Understand K (2), Applying(K3))**

L. No.	Topics	Sub Topics	Date of implementation	Pedagogy	CO-Covered	Faculty Sign	HoD's Remark with Date
Unit - 1							
1.	**Introduction and discussion about the subject and syllabus**	Course Objective and Course Outcomes			**CO-1 to CO-5**		
2.	**Introduction to Data Structure and its Characteristics Array**	Representation of single and multidimensional arrays		• Lecture • Brainstorming	**CO-1**		
3.		Sparse arrays		• Lecture • Brainstorming	**CO-1**		
4.		lower and upper triangular matrices		• Lecture • Brainstorming	**CO-1**		
5.		Tridiagonal matrices with Vector Representation		• Lecture • Brainstorming	**CO-1**		

Unit 2							
6.	**Stacks and Queues**	Introduction and primitive operations on stack		• Lecture • Brainstorming • Demonstration	**CO-2**		
7.		Stack application		• Lecture • Brainstorming • Demonstration	**CO-2**		
8.		Infix		• Lecture • Brainstorming • Demonstration	**CO-2**		
9.		postfix		• Lecture • Brainstorming • Demonstration	**CO-2**		
10.		prefix expressions		• Lecture • Brainstorming • Demonstration	**CO-2**		
11.		Evaluation of postfix expression		• Lecture • Brainstorming • Demonstration	**CO-2**		
12.		Conversion between prefix		• Lecture • Brainstorming • Demonstration	**CO-2**		
13.		infix and postfix		• Lecture • Brainstorming • Demonstration	**CO-2**		
14.		introduction and primitive operation on queues		• Lecture • Brainstorming • Demonstration	**CO-2**		
15.		D- queues and priority queues		• Lecture • Brainstorming • Demonstration	**CO-2**		
Unit - 3							
16.	**Lists**	Introduction to linked lists		• Lecture • Brainstorming • Demonstration	**CO-3**		
17.		Sequential and linked lists		• Lecture • Brainstorming • Demonstration	**CO-3**		

18.		operations such as traversal,		• Lecture • Brainstorming • Demonstration	**CO-3**		
19.		insertion		• Lecture • Brainstorming • Demonstration	**CO-3**		
20.		deletion		• Lecture • Brainstorming • Demonstration	**CO-3**		
21.		searching		• Lecture • Brainstorming • Demonstration	**CO-3**		
Unit - 4							
22.	**Introduction of Trees:**	Introduction and terminology		• Lecture • Brainstorming • Demonstration	**CO-4**		
23.		Traversal of binary trees		• Lecture • Brainstorming • Demonstration	**CO-4**		
24.		Recursive algorithms for tree operations such as traversal		• Lecture • Brainstorming • Demonstration	**CO-4**		
25.		insertion		• Lecture • Brainstorming • Demonstration	**CO-4**		
26.		deletion		• Lecture • Buzz Grouping • Demonstration	**CO-4**		
27.		Binary Search Tree		• Lecture • Brainstorming • Demonstration	**CO-4**		
28.		Revision of Unit 4		• Lecture • Brainstorming • Buzz grouping	**CO-4**		
Unit - 5							
29.	**B-Trees**	Introduction of B-tree		• Lecture • Brainstorming	**CO-5**		

	:			• Demonstration			
30.		The invention of B-Tree,		• Lecture • Brainstorming • Demonstration	**CO-5**		
31.		Statement of the problem,		• Lecture • Brainstorming • Demonstration	**CO-5**		
32.		Indexing with binary search trees		• Lecture • Brainstorming • Demonstration	**CO-5**		
33.		a better approach to tree indexes		• Lecture • Brainstorming • Demonstration	**CO-5**		
34.		B-Trees; working up from the bottom		• Lecture • Brainstorming • Demonstration	**CO-5**		
35.		Example for creating a B-Tree		• Lecture • Brainstorming • Demonstration	**CO-5**		
36.		Revision of Unit 5		• Brainstorming • Buzz grouping	**CO-5**		
Unit-6							
37.	**Sorting and Searching**	Sorting Techniques		• Lecture • Brainstorming • Demonstration	**CO-6**		
38.		Insertion sort		• Lecture • Brainstorming Demonstration	**CO-6**		
39.		selection sort		• Lecture • Brainstorming Demonstration	**CO-6**		
40.		merge sort,		• Lecture • Brainstorming Demonstration	**CO-6**		
41.		heap sort		• Lecture • Brainstorming Demonstration	**CO-6**		
42.		searching Technique		• Lecture • Brainstorming	**CO-6**		

		s: linear search		Demonstration			
43.		binary search		• Lecture • Brainstorming Demonstration	**CO-6**		
44.		hashing		• Lecture • Brainstorming Demonstration	**CO-6**		

Text Books:

1. E.Horowiz and S.Sahani, " Fundamentals of Data structures", Galgotia Book source Pvt. Ltd.2003
2. R.S.Salaria, " Data Structures & Algorithms" , Khanna Book Pblishing Co. (P) Ltd..,2002

Reference Books:

3. Y.Langsam et. Al., " Data Structures using C and C++" , PHI, 1999