Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Internal	Final Exam	Total
BCAMJ-201	Data Structure Using C Language	Major	4	4	0	0	40	60	100

Course Outcomes

At the end of the course the student will be able to	
CO1	Explain the basics of data types and data structures.
CO2	Compare different data structures in context of their properties.
CO3	Identify the use of appropriate data structures to solve a given problem.
CO4	Apply different data structures to solve different sorting and searching problems.
CO5	Appreciate applicability of advanced data structures to model and solve real world problems.

Detailed Syllabus

Section A

Unit 1: Introduction to data structures: Binary and Decimal Integers, Real Numbers, Character Strings, Abstract Data Types, Sequences as Value Definitions, Data Types in C, Pointers in C, Data Structures and C, Representation of Arrays, Structures in C.

(3 Hrs.)

Unit 2: Stacks: Concept of Stacks, Operation on Stacks, Representing Stacks in C, Implementing the pop Operation, Testing for Exceptional Conditions, Implementing the Push Operation, Multiple stacks, Application of stacks in Infix, Postfix, Prefix, and Recursion.

Queues: Concept of Queues, Operation on Queues, Representing Stacks in C, Multiple Queues, Priority Queues, Circular Queues.

(10 Hrs.)

Unit 3: Linked Lists: Concept of Linked Lists, Representing Linked Lists in C, Insertion, Deletion and Traversal on Linear Linked Lists, Doubly Linked List, Circular Linked List, Linked List as Data Structure, Header nodes, Implementation of Stacks and Queues using linked list, Dynamic memory management, Garbage Collection.

(10 Hrs.)

Section-B

Unit 4: Trees: Binary trees and their representation using Linked list, Operations on Binary Trees, Traversal Algorithms, Applications, Threaded Binary Trees and its Traversal algorithms, Heterogeneous Binary Trees, List representation. Using Binary Trees, Optimum Search Trees, AVL trees.

Graphs: Representation of Graphs, Traversal methods, Applications Undirected Graphs, Directed Graph and Traversal, Depth First Search, Breadth First Search

(18 Hrs.)

Unit 5: Sorting and Searching: Exchange Sort (Bubble, Quicksort) Selection and Tree Sorting Insertion sort, Shell Sort, Address Calculation Sort, Merge and Radix Sort, Sequential Searching, searching an Ordered Table, Index sequential. Search, Binary search, Interpolation search, Tree searching.

(5 Hrs.)

Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Data Structure using C	Langsam, Yedidyah, Moshe J. Augenstein, and Aaron M. Tenenbaum	Pearson Education	1st(2019)
2	Data Structures and Program Design in C	Robert L. Kruse and Bruce P. Leung	Pearson Education.	2nd(2006)