

MANGALORE UNIVERSITY
Bachelor of Science (B.Sc.) Degree Programme
Choice Based Credit System (2019-2020 Onwards)
Computer Science
III Semester – Detailed Syllabus

Group I	BSCCSC 231 Data Structures	I.A.: 20
Theory/Week: 4Hours		Exam: 80
48 Hours		Credits: 2
Topic		Books and Pages
UNIT - I		
<p>Introduction to Data Structures: Introduction: Definition, Need for Data Structures, Types of Data structures.</p> <p>Linear Data Structures: Arrays Definition, Declaration and storage of one- and two-dimensional arrays. Sparse matrices.</p> <p>Sorting: Introduction, Bubble sort, Insertion sort, Selection sort, Quick sort and Merge sort. Comparison of different sorting techniques.</p>		<p>1, 18, 20 (Book 2)</p> <p>25 - 26 (Book 2), 4.60 (Book 1), 9.1, 4.15, 9.6 - 9.9, 9.10 - 9.13, 6.25 - 6.31, 9.19 - 9.23 (Book 1) (Complexity excluded)</p>
UNIT - II		
<p>Searching-Introduction, Linear search, Binary Search, Comparison of different searching techniques. Linked List: Introduction, characteristics, types of linked lists, Representation of singly linked list in memory, Dynamic memory allocation, Singly linked list - Operations, algorithms, Representation of polynomials using linked lists, addition of polynomials. Circular linked list- Operations, Doubly linked list - operations. Memory allocations and garbage collection.</p>		<p>9.38, 4.19 - 4.21, 4.22-4.26 (Complexity excluded) (Book 1), 5.2-5.3(Book 1), 33& 35 (Book 2), 5.4-5.8, 5.8-5.38, 5.45-5.47 (includes examples and algorithm), 5.47-5.63 (includes two-way header lists), 5.17-5.21 (Book 1)</p>
UNIT - III		
<p>Stacks- Array representation of stacks, Linked representation of stacks, operations, Applications of stacks- Recursion, Implementation of recursive procedure by stack (factorial function and Fibonacci sequence).</p> <p>Arithmetic expressions: prefix, infix and postfix notation, infix to postfix conversion, evaluation of postfix expression. Queues: Array representation of queue, Linked representation of queue, Types of queues- Simple queue, circular queue, double-ended queue, priority queue, operations on queues.</p>		<p>6.1-6.11, 6.12-6.14, 6.25-6.31 (repeated concept-UNIT-I), 6.33-6.38, 6.44-6.50 (Book 1)</p> <p>6.15 - 6.25, 6.50-6.86 (Book 1)</p>

UNIT - IV

Trees: Terminologies, types, tree properties, binary tree-properties, memory representation - Array and Linked representation, Binary search tree - Creation through insertion, searching. Tree traversals - recursive algorithms for tree traversals, Applications of binary trees representation of an expression using binary tree.	7.3, 7.1 - 7.2, 7.3 - 7.8, 7.28 - 7.36, 7.9 - 7.23, 7.37 - 7.38,
Graphs: Terminologies, Matrix representation of graphs, Traversals: Breadth First Search and Depth first search.	8.1 - 8.8, 8.17 - 8.20, 8.31 - 8.39 (Book 1)

Text Books

1. **Data Structures with C** by Seymour Lipschutz, Schaum's Outlines Series, Tata McGraw Hill, 2011
2. **Data Structures** by R. Venkatesan and S. Lovelyn Rose, First Edition: 2015, Wiley India Pvt. Ltd. Publications, 2011

Reference Books

1. **Data Structures and Algorithm Analysis in C** by Mark Allen Weiss, 2nd Edition, Pearson Educations, 2013
2. **Data Structures Using C and C++**, Yedidyah Langsam, Moshe J. Augenstein and Aaron M. Tenenbaum, 2nd Edition, PHI Publication, 2014
3. **An Introduction to Data Structures with Applications**, 2nd Edition, by J.P. Tremblay and Sorenson, McGraw Hill 2000

Group I Practical 3	BSCCSP 232 Data Structures Lab	I.A.: 10
Theory/Week: 3 Hours		Exam: 40
36 Hours		Credit: 1
Part A		
1.	Write a C program to sort the numbers using bubble sort method.	
2.	Write a C program to sort the numbers using quick sort method.	
3.	Write a C program to sort the numbers using insertion sort method.	
4.	Write a C program to search an element in the array using linear search method.	
5.	Write a C program to search an element in the array using binary search method.	
Part B		
6.	Write a C program to implement the stack operations using arrays.	
7.	Write a C program to evaluate a postfix expression.	
8.	Write a C program to implement queue operations using arrays.	
9.	Write a C program to perform the inorder, preorder and postorder traversal of a binary search tree.	
Part C		
10.	Write a menu driven C program to create a singly linked list and implement the following operations: <ul style="list-style-type: none"> • Insert after a given node • Delete a given element • Count and display the contents of the list 	
11.	Write a C program to implement stack operations using linked list.	
12.	Write a C program to implement queue operations using linked list.	
13.	Write a C program to add two polynomials using linked list.	

Scheme of Examination

Sl. No.	Details			Marks	Total
1	Part - A	i	Problem solving and coding	4	8
		ii	Compiling and debugging	2	
		iii	Execution and result	2	
2	Part - B	i	Problem solving and coding	5	10
		ii	Compiling and debugging	3	
		iii	Execution and result	2	
3	Part - C	i	Problem solving and coding	6	12
		ii	Compiling and debugging	3	
		iii	Execution and result	3	
4	Class Records				5
5	Viva -Voce				5
Total Marks					40