TELANGANA STATE COUNCIL OF HIGHER EDUCATION
FACULTY OF SCIENCE
B.Sc. (Computer Science)
CBCS Pattern with Effect from the Academic Year 2025-26
Structure of Curriculum

Course Title	Hours/Week		Credits		
	Theory	Practical	Theory	Practical	Total
Semester-I					
Programming in C	4	2	4	1	5
Semester-II					
Data Structures using C	4	2	4	1	5
Semester-III					
Database Management Systems	4	2	4	1	5
Semester-IV					
Programming in Java	4	2	4	1	5
Semester-V					
Python Programming	4	2	4	1	5
Semester-VI-ELECTIVE					
(A) Web Technologies	4	2	4	1	5
(B) Computer Networks	4	2	4	1	5
(C) Data Science with Python	4	2	4	1	5
SEC-I SEMESTER-III					
Digital Documentation and Analysis	2		2	-	2
Power BI	2		2	-	2
SEC-II SEMESTER-IV					
Artificial Intelligence	2		2	-	2
Software Engineering	2		2	-	2
SEC-III SEMESTER-V					
Cyber Security	2		2	-	2
Block Chain Technology	2		2	-	2
Generic Elective (other than computer science students) SEMESTER-V					
Emerging Trends in Computer Science	4		4	-	4

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FACULTY OF SCIENCE
B.Sc. (Computer Science)
SEMESTER – II
Data Structures Using C
(w.e.f. 2025-2026)

Theory: 4 Hours/Week **Credits: 4**

Internal Marks = 40 **External Marks =60**

Course Objectives:

Cob1: To discuss the linear data structures and their applications.

Cob2: To Understand Queues, Linked list and Hashing Concepts .

Cob3: To understand and implement trees and graphs with efficient traversal, searching, and optimization techniques.

Cob4: Analyze and implement advanced searching and sorting techniques, including hashing and overflow handling, to optimize data organization and retrieval.

Course Outcomes:

CO1: Understand and implement fundamental data structures, including arrays and stacks, for efficient data manipulation and expression evaluation.

CO2: Apply linked lists, queues, and hashing techniques to optimize data storage, retrieval, and processing.

CO3: Analyze and implement tree and graph structures, including traversal techniques and efficient searching strategies.

CO4: Develop and optimize searching and sorting algorithms to enhance data organization and retrieval efficiency.

UNIT I

Introduction to Data structures: Definition, Types of Data structures.

Arrays: Arrays – ADT, ordered lists, Sparse matrices, representation of arrays.

Stacks: Stack ADT, Stacks using Arrays, Stacks using dynamic arrays, Evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix expression, checking well-formed parenthesis, reversing a string.

UNIT II

Queues: Queues ADT, operations, Circular Queues, Applications.

Linked Lists: Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for circularly linked lists, Equivalence Classes, Doubly Linked Lists. **Hashing:** Static Hashing, Hash Tables, Hash Functions, Overflow Handling, Theoretical Evaluation of Overflow Techniques.

UNIT III

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching an element, Insertion into a BST, and Deletion from a BST, Efficient Binary Search Trees. AVL Trees: Definition, Insert, search and delete operations.

Graphs: Graph Abstract Data Type, Elementary Graph operations, Graph Traversal Techniques - DFS and BFS, Minimum Cost Spanning Trees - Prim's and Kruskal's Algorithms.

UNIT IV

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Searching and Sorting: Sequential search, Binary search, Hash Tables: Hashing Functions, Types of handling techniques, Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Heap sort,

Suggested Book

Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition (2008), Universities Press.

Reference Books

1. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
2. Kushwaha D. S and Misra A.K, Data structures A Programming Approach with C, Second Edition (2014), PHI.
3. ilberg R. F and Forouzan B. A, Data structures: A Pseudocode Approach with C, Second Edition (2007), Cengage Learning
4. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition (2009). MIT Press
6. Chandan Banerjee and Atanu Das, "Data Structures and Algorithms in C and PYTHON", University Press, 2023.
7. YedidyahLangsam, Moshe J. Augenstein, Aaron M. Tenenbaum, Data Structures Using C and C++, Second Edition (2009), PHI

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