

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DATA STRUCTURES AND ALGORITHMS
(OPEN ELECTIVE-II)

SYLLABUS FOR B.E. IV SEMESTER
Common for ECE and EEE

L : T : P(Hrs./week): 3	SEE Marks:60	Course Code: U200E420CS
Credits: 3	CIE Marks :40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are	At the end of the course, students will be
1. Understand Basic linear and non-linear data structures and learn techniques of recursion	1. Understand the basic concepts of data structures.
2. Understand concepts of Linked lists	2. Understand the notations used to analyze the performance of algorithms.
3. Understand Concepts of Stacks and queues	3. Choose and apply an appropriate data structure for a specified application.
4. Understand Concepts of Trees	4. Understand the concepts of recursion and its applications in problem

Unit I

Algorithm Specification- Introduction, Recursive algorithms, Data Abstraction, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations. **Arrays:** Arrays - ADT, Polynomials, Sparse matrices

Unit II

Strings-ADT, Pattern Matching, **Linked Lists:** Singly Linked Lists and Chains, Linked Stacks and Queues, Polynomials, Operations for Circularly linked lists, Equivalence Classes, Sparse matrices, Doubly Linked Lists.

Unit III

Stacks and Queues: Stacks, Stacks using dynamic arrays, Queues, Circular Queues using dynamic arrays, A Mazing Problem, Evaluation of Expressions – Evaluating Postfix Expression, Infix to Postfix.

Unit IV

Sorting: Insertion Sort, Quick sort, Merge sort, Heap sort, Sorting on Several Keys, List and Table Sorts. **Hashing :**Introduction, Static Hashing, Hash tables, Hash functions, Overflow handling.

Unit V

Trees: Introduction, Binary Trees, Binary Tree Traversals, Heaps, Binary Search trees (BST): Definition, Searching a BST, Insertion into a BST, Deletion from a BST. **Graphs:** The Graph ADT, Elementary graph operations, Minimum Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

Learning Resources:

1. Horowitz E, Sahni S and Susan Anderson-Freed, Fundamentals of Data structures in C, 2nd Edition(2008), Universities Press.
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, 2nd Edition (2002), Pearson.
3. Kushwaha D. S and Misra A.K, Data Structures A Programming Approach with C, Second Edition(2014), PHI.,
4. Gilberg R. F and Forouzan B. A, Data Structures: A Pseudocode Approach with C, Second Edition(2007), Cengage Learning
5. Tanenbaum A. M ,Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson.
6. Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein, Introduction to Algorithms, Third Edition(2009), MIT Press
7. YedidyahLangsam , Moshe J. Augenstein ,Aaron M. Tenenbaum, Data Structures Using C and C++ , Second Edition(2009), PHI
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos>
9. <http://nptel.ac.in/courses/106106127/>
10. <http://www.nptel.ac.in/courses/106102064>

The break-up of CIE: Internal Tests + Assignments + Quizzes

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1	No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Tests	:	<input type="text" value="30"/>
2	No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3	No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
	Duration of Internal Tests	:	1 Hour 30 Minutes			