

SES's L.S. RAHEJA COLLEGE OF ARTS AND COMMERCE (AUTONOMOUS)



BOARD OF STUDIES: Information Technology and Data Science

PROGRAMME: Bachelor of Science (Information Technology)

SEMESTER: III

NOMENCLATURE OF THE COURSE: Basics of Data Structure

NEP Vertical: Minor

Credit: 02

(As Per Choice Based Credit System (under NEP 2020) with effect from the academic year 2025-26)



Programme:	Bachelor of Science (Information Technology)
Nomenclature of the Course	Basics of Data Structure
Total Marks	50
Semester:	III
Academic year	2025-26

LEARNING OBJECTIVES:

1. **Ability to analyze the performance of algorithms.**
2. **Ability to choose appropriate algorithm design techniques for solving problems.**
3. **Understand how data structure choices and algorithm design affect program performance.**

COURSE OUTCOMES:

1. **Identify and distinguish data structure classification, data types, their complexities**
2. **Implement array, linked list, stack and queue.**
3. **Implement trees, various hashing techniques and graph for various applications**

Unit	Course Content	Andragogy	No of Lectures
I	<p>Introduction to Data Structure: Types of Data Structure, Abstract data types, Concept of Files, Operations with files, types of files. Arrays: Types: Liner arrays, Multidimensional Arrays, Pointer Arrays. Operations on arrays: Traversing, Inserting, Deleting elements from an array</p> <p>Linked list: Representation, Linked list vs. Arrays, Operations on Linked list: Insertion Deletion, Traversing, Searching, Types of Linked list, Garbage Collection, Applications of Linked lists: Evaluation of Polynomials</p> <p>Stacks: Array representation of Stack, Linked representation of Stack</p> <p>Queues: Array and Linked Representation of Queues, Types of Queues: Deques, Priority Queue , Applications of Queues (Any two – Ex: Scheduling, Buffering)</p>	<ul style="list-style-type: none"> • Give students problems: Provide problems for students to solve independently or in groups. • Focus on practical applications: Present knowledge and abilities in terms of their practical uses. 	15
II	<p>Trees: Terminology, Binary Tree representation, Operations on Binary trees, Binary tree traversals, Types of Binary Trees: Left & Right skewed, Complete, Extended, Threaded, Expression and Multiway search trees, Applications of Binary trees: Binary Search Tree</p> <p>Graph: Introduction, Definition, Graph Representations Graph traversal: Depth</p>	<ul style="list-style-type: none"> • Give students problems: Provide problems for students to solve independently or in groups. • Focus on practical applications: Present knowledge and abilities in terms of their practical uses. 	15

	First Search and Breadth First search, Applications of Graphs: Shortest Path Algorithm – Dijkstra’s, Minimum Spanning tree – Prim’s &Kruskal’s Algorithms. Introduction to analysis of algorithm: Design and analysis fundamentals, Performance analysis: Space and time complexity, Growth of function – Big- Oh, Omega, Theta notation.		
--	---	--	--

SUGGESTED READINGS

1. R.B. Patil, H.J. Dand and R. Dahake, A Practical Approach to R Tool, SPD
2. Murray R. Spiegel, Larry J. Stephens, STATISTICS, MCGRAW –HILL INTERNATIONAL

QUESTION PAPER PATTERN

(A) FOR CONTINUOUS EVALUATION

Particulars	Marks
Presentation/Viva Voce/Quiz	10
Assignment/Project	10
Total	20

(B) FOR SEMESTER END EXAMINATION

Maximum Marks: 30

Duration: 1 Hours

Question No.	Description	Total Marks
Q. 1	Attempt the following Unit I	15
A	Remembering	
B	Analysing	
C	Applying	
	OR	
P	Remembering	
Q	Analysing	
R	Applying	
Q. 2	Attempt the following Unit II	15
A	Understand	
B	Creating	
C	Evaluating	
	OR	
P	Understand	
Q	Creating	
R	Evaluating	