Th-2 DATA STRUCTURE
Common to (CSE/IT)

Theory	4 Periods per week	Internal Assessment	20 Marks
Total Periods	60	End Sem Exam	80 Marks
Examination	3hours	Total Marks	100Marks

A.   **Topic wise distribution of periods**

Sl. No.	Topics	Periods
1	INTRODUCTION	04
2	STRING PROCESSING	03
3	ARRAYS	07
4	STACKS & QUEUES	08
5	LINKED LIST	08
6	TREE	08
7	GRAPHS	06
8	SORTING SEARCHING & MERGING	08
9	FILE ORGANIZATION	08
	TOTAL	**60**

B. RATIONAL: The study of **Data structure** is an essential part of computer science. Data structure is a logical & mathematical model of storing & organizing data in a particular way in a computer. In system programming application programming the methods & techniques of data structures are widely used. The study of data structure helps the students in developing logic & structured programs.

C.OBJECTIVE: After completion of this **course** the student will be able to**:**
- Understand the concepts of linear data structures, their operations and applications
- Understand the operation in abstract data type like Stack and Queue.
- Understand the concept of pointers and their operations in linked list.
- Know the concepts of non-linear data structures, their operations and applications in tree and graph.
- Understand the various sorting and searching techniques.
- Understand file storage and access techniques.

D. DETAIL CONTENT:

1.0   INTRODUCTION:

1.1   Explain Data, Information, data types

1.2   Define data structure & Explain different operations

1.3   Explain Abstract data types

1.4   Discuss Algorithm & its complexity

1.5   Explain Time, space tradeoff

2.0   STRING PROCESSING

2.1   Explain Basic Terminology, Storing Strings

2.2   State Character Data Type,

2.3   Discuss String Operations

3.0   ARRAYS

3.1   Give Introduction about array,

3.2   Discuss Linear arrays, representation of linear array In memory

3.3   Explain traversing linear arrays, inserting & deleting elements

3.4   Discuss multidimensional arrays, representation of two dimensional arrays in memory (row
major order & column major order), and pointers

3.5   Explain sparse matrices.

4.0   STACKS & QUEUES

4.1   Give fundamental idea about Stacks and queues

4.2   Explain array representation of Stack

4.3   Explain arithmetic expression ,polish notation & Conversion

4.4   Discuss application of stack, recursion

4.5   Discuss queues, circular queue, priority queues.

5.0   LINKED LIST

5.1   Give Introduction about linked list

5.2   Explain representation of linked list in memory

5.3   Discuss traversing a linked list, searching,

5.4   Discuss garbage collection.

5.5   Explain Insertion into a linked list, Deletion from a linked list, header linked list

6.0   TREE

6.1   Explain Basic terminology of Tree

6.2   Discuss Binary tree, its representation and traversal, binary search tree,   searching,

6.3   Explain insertion & deletion in a binary search trees

7.0   GRAPHS

7.1   Explain graph terminology & its representation,

7.2   Explain Adjacency Matrix, Path Matrix

8.0   SORTING SEARCHING & MERGING

8.1   Discuss Algorithms for Bubble sort, Quick sort,

8.2   Merging

8.3   Linear searching, Binary searching.

9.0   FILE ORGANIZATION

9.1   Discuss Different types of files organization and their access method,

9.2   Introduction to Hashing, Hash function, collision resolution, open addressing.

Coverage of Syllabus upto Internal Exams (I.A.)
Chapter 1,2,3,4

Book Recommended:-

SI No.	Name of Authors	Title of Book	Name of Publisher:
1	S. Lipschutz	Data Structure	Schaum Series
2	A.N.Kamthane	Introduction to Data Structure in C	Pearson Education
3	Reema Thereja	Data Structure using C	Oxford University Press