



Faculty of: **Computer Science**

Course: **Bachelor of Science Information Technology**

Semester: **II**

Subject Code: **ITM204-1C**

Subject Name: **DATA STRUCTURES**

Sr. No	Category	Subject Code	Subject Name	Teaching hours/ Week			Credit hours	Credit Points	Evaluation Scheme/ Semester								Total
				Th	Tu	Pr			Theory				Practical				
									Continuous and Comprehensive Evaluation		End Semester Exams		Internal Assessment		End Semester Exams		
									Marks	Marks	Marks	Duration	Marks	Duration	Marks	Duration	
2	MAJOR-IV	ITM204-1C	DATA STRUCTURES	3	--	2	5	4	10	Assignment	50	2	25	1	-	-	100

AIM: To develop proficiency in problem solving and programming. • Achieve an understanding of fundamental data structures and algorithms • To get a good understanding of applications of Data Structures. • To develop a base for advanced study in Computer Science.

COURSE CONTENTS

- **Unit -1 : User Define Functions** **(08 Lectures)**
 - [a] Introduction to UDF, Types of UDF
 - [b] Call by reference, call by value
 - [c] Passing array as parameters to Function.
 - [d] Declaring and initializing Pointers
 - [e] Advantage and disadvantage of pointers
 - [f] Passing pointer to function
 - [g] Relationship between pointer and arrays

- **Unit -2 : Dynamic memory allocation** **(05 Lectures)**
 - [a] Dynamic memory allocation in C
 - [b] malloc(), calloc (), realloc() and free() function.
 - [c] Characteristics of data structure.
 - [d] Types of data structure.

- **Unit -3 : Searching and Sorting** **(08 Lectures)**
 - [a] Linear Search, Binary Search.
 - [b] Bubble sort, Selection sort, merge sort, Insertion sort

- **Unit -4 : Stack and Queue** **(08 Lectures)**
 - [a] Introduction to stack.
 - [b] Stack representation and implementation

- [c] Operations on stack, push, pop, peek
- [d] Application of stack.
- [e] Introduction to Queue
- [f] Implementation of Queue using Array.
- [g] Operations on Queue: Create, add, delete
- [h] Introduction and implementation of Circular queue.
- [i] Introduction to De-queue.

• **Unit -5 : Linked List**

(08 Lectures)

- [a] Introduction to Linked List.
- [b] Representation and implementation of Singly Linked List
- [c] Traversing and searching of singly Linked List
- [d] Insertion and deletion in singly linked list,
- [e] Types of linked list

• **Unit -6 : Tree**

(08 Lectures)

- [a] Introduction to tree, basic terminology used in Tree.
- [b] Binary tree, properties of binary tree
- [c] Traversal of binary tree: pre, post and in-order
- [d] Concept of Binary search tree,

Arrangement of lectures duration and practical session as per defined credit numbers:

Units	Lecture Duration (In Hrs.)		Calculation of Credits (In Numbers)		Total Lecture Duration	Credit Calculation
	Theory	Practical	Theory	Practical	Theory + Practical	Theory + Practical
Unit -1	08	5	3	1	13	4
Unit -2	05	3			08	
Unit -3	08	4			12	
Unit -4	08	6			14	
Unit -5	08	6			14	
Unit -6	08	6			14	
Total	45	30	3	1	75	4

Evaluation:

Theory Marks	Practical Marks	Total Marks
75	25	100

REFERENCE BOOKS:

- “Data Structure through C/C++”, R.B.Patel, Khanna Publication
- “Data and File Structure”, Trembley & Sorenson, TMH Publication
- “Data Structure & algorithms Using C”, R.S.Salaria, Khanna Publication
- “Data structure through C/C++”, Tennaunbuam
- “Let us C”, Y Kanetkar, BPB Publication (3rd Edition).

NPTEL COURSE (<https://nptel.ac.in/>):

Introduction to data structure and algorithms. IIT Delhi, Prof. Naveen Garg

- <https://nptel.ac.in/courses/106102064>