DEPARTMENT OF COMPUTER SCIENCE				CLASS: I B.Sc. Computer Science				
Semester	Course Type	Course Code	Course Title	Credits	Contact Hours/week	CIA	Ext	Total
II	Major Core - 3	20U2DMC3	Data structures and Algorithms	3	4	25	75	100

COURSE OBJECTIVES :

To introduce various data structures and their implementations and learn various sorting and searching algorithms.

Units	Data structures and algorithms --Course Contents	Total Hours: 60
Unit -I	Introduction of algorithms, analysing algorithms, Arrays : Representation of Arrays, Implementation of Stacks and queues, Application of Stack: Evaluation of Expression - Infix to postfix Conversion - Multiple stacks and Queues, Sparse Matrices.	12 hrs
Unit-2	Linked list : Singly Linked list - Linked stacks and queues - polynomial addition - More on linked Lists - Doubly linked List and Dynamic Storage Management - Garbage collection and compaction.	12 hrs
Unit-3	Trees: Basic Terminology - Binary Trees - Binary Tree representations - Binary trees - Traversal - More on Binary Trees - Threaded Binary trees - counting Binary trees. Graphs: Terminology and Representations - Traversals, connected components and spanning Trees, Single Source Shortest path problem.	12 hrs
Unit-4	Symbol Tables : Static Tree Tables - Dynamic Tree Tables - Hash Tables : Hashing Functions - overflow Handling. External sorting : Storage Devices - sorting with Disks : K-way merging - sorting with tapes.	12 hrs
Unit-5	Internal sorting : Insertion sort - Quick sort - 2 way Merge sort - Heap sort - shell sort - sorting on keys. Files: Files, Queries and sequential organizations - Index Techniques - File organization.	12 hrs

Text Books
1. Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia publication.

Reference Books
1. Data structures Using C Aaron M. Tanenbaum, Yedidyah Langsam, Moshe J.Augenstein, Kindersley (India) Pvt. Ltd.,
2. Data structure and Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D.Ullman, Pearson Education Pvt. Ltd.,

Lesson Plan:

Units	Topics	Hrs	Mode
Unit -I	Introduction of algorithms, analysing algorithms.	3	Chalk and Talk, Quiz and PPT
	Arrays : Representation of Arrays Implementation of Stacks and queues	3	
	Application of Stack: Evaluation of Expression - Infix to postfix Conversion	3	
	Multiple stacks and Queues, Sparse Matrices.	3	
Unit-2	Linked list : Singly Linked list .	2	Chalk and Talk, PPT and Assignment
	Linked stacks and queues - polynomial addition .	4	
	More on linked Lists - Doubly linked List and Dynamic Storage Management	3	
	Garbage collection and compaction.	3	
Unit-3	Trees: Basic Terminology - Binary Trees	2	Chalk and Talk, PPT and Group Discussion
	Binary Tree representations - Binary trees - Traversal	3	
	More on Binary Trees - Threaded Binary trees - counting Binary trees	3	
	Graphs: Terminology and Representations	2	
	Traversals, connected components and spanning Trees, Single Source Shortest path problem.	2	
Unit-4	Symbol Tables : Static Tree Tables -.	2	Chalk and Talk, PPT and Assignment
	Dynamic Tree Tables - Hash Tables :	3	
	Hashing Functions - overflow Handling	3	
	External sorting : Storage Devices - sorting with Disks : K-way merging - sorting with tapes.	4	
Unit-5	Internal sorting : Insertion sort - Quick sort	4	PPT, Chalk and Talk, and Quiz
	2 way Merge sort - Heap sort - shell sort – sorting on keys.	3	
	Files: Files, Queries and sequential organizations	3	
	Index Techniques - File organization.	2	

COURSE LEARNING OUTCOMES:

On the completion of the course the students will be able to

	COURSE LEARNING OUTCOME	**Knowledge Level (basis of Bloom's Taxonomy)**
CLO-1	Describe various algorithms and construction of Stack and Queue.	K1
CLO-2	Explain the concepts of Linked lists and construct the linked list related applications.	K4
CLO-3	Illustrate the ideas about binary trees, tree traversals and graphs.	K3
CLO-4	Describe the concepts related with symbol tables, hashing functions and storage devices.	K1, K3
CLO-5	Construct the algorithms for various sorting techniques and files with its various queries and indexing techniques.	K4

MAPPING OF CLOs WITH PSOs:

Course Learning Outcomes	PSO 1 (Knowledge Base)	PSO 2 (Problem Analysis & Investigation)	PSO 3 (Communication Skills & Design)	PSO 4 (Individual and Team Work)	PSO 5 (Professionalism Ethics and equity)	PSO 6 (Life Long Learning)
CLO-1	3	2	1	2	1	1
CLO-2	3	3	1	1	2	1
CLO-3	3	2	1	1	1	2
CLO-4	3	2	2	1	2	3
CLO-5	2	3	3	3	2	1

3- Advanced Application   2- Intermediate   1- Introductory