CS-301: DATA STRUCTURE

Teaching Scheme			Credits	Marks			Duration End Semester Examination
L	T	P/D	C	Sessional	End Semester Exam	Total	
3	1	0	4	40	60	100	3 hrs

COURSE CONTENT:

UNIT	CONTENT	No. of Hrs.
I	**Data Structures:** Definition, primitive and derived data types, abstract data types, need for data structures, types of data structures. **Algorithm:** Definition, characteristics, development of algorithm, analysis of complexity:- time complexity, space complexity, order of growth, asymptotic notation with example, obtaining the complexity of algorithm. **Arrays:** Definition, 1d and 2d arrays, operations on arrays, sparse matrices, structures and arrays of structures.	10
II	**Linked list:** Representation of linked list in memory, allocation & garbage collection, operations on linked list, doubly linked lists, circular linked list, linked list with header node, applications. **Stacks:** representation of stack in memory, operations on stack and applications. **Queues:** Representation of queues in memory, operations on queues, circular queues, double ended queues, priority queues, applications.	10
III	**Trees:** Introduction, representation of tree in memory. **Binary Trees:** Terminology, binary tree traversal, binary search tree, insertion, deletion & searching in binary search tree, heap trees, types of heap trees, insertion, deletion in heap tree with example, heap sort algorithm, introduction of AVL trees & B-trees. **Graphs:** Definition, representation of graph (adjacency matrix, adjacency list), traversing a graph (DFS & BFS), dijkstra's algorithm for shortest distance, minimum spanning tree.	10
IV	**Searching and sorting:** Need for searching and sorting, linear and binary search, insertion sort, selection sort, merge sort, quick sort, radix sort and bubble sort. **Hash Tables:** Introduction, hash function, collision resolution techniques in hashing, deletion from hash table.	9

Text Books:
1. Seymour Lipschutg : Theory and practice of Data structure , Tata Mc. Graw Hill 1998
2. Tenebaum, A. Lanhgsam Y and Augensatein , A. J: Data structures using C++ , Prentice Hall of India.

Reference Books:
1. Data structure and Algorithms in C++ by Micheal T. Goodrich, Wiley India publication.
2. Data structures, R.Venkatesan, S.Lovelyn Rose, Wiley India publication.
3. Data Structure using C++ By Patil, Oxford University press.
4. Data Structure , Algorithm and Object-Oriented programming , Gregory L. Heileman, Tata Mc-Graw Hills.
5. S. Sahni , " Data structure Algorithms ad Applications in C++", WCB/McGraw Hill.
6. J.P. Tremblay and P.G. Sorenson, "An Introduction to Data Structures with applications", Tata McGraw Hill.