Data Structures

I YEAR SEM-1 B.Tech CSE	CORE	L	T	P	C
CODE:CS1202	DATA STRUCTURES	2	2	0	4

COURSE OBJECTIVES	
1.	Master the implementation of different data structures.
2.	Be familiar with writing recursive methods
3.	Demonstrate understanding of the abstract properties of various data structures
4.	Demonstrate understanding of various sorting algorithms,
5.	Implement various data structures in more than one manner.
6.	Choose the appropriate data structure for a specified application and different scenarios

SYLLABUS
(CS1203) Data structures

UNITI (Linked Lists)
Definition, Linear and Non Linear DS, List of Data Structures, Applications of DS, Motivation, Definition, Linked List; SLL: Introduction, Definition, Defining Node of an SLL; Operations on SLL: Creation, Traversal, Insertion at Begin, End, Middle; Header, Node, Deleting SLL: Deletion at Begin, Deletion at End, Deletion at Middle, Circular Linked Lists, Double Linked Lists.Working Examples on Linked Lists.

UNITII (Stacks)
Introduction, Array representation, Operations on Stack. Linked List representation of stack, Application of Stacks

UNIT III(Queues)
Introduction of queues, Array representation, Linked representation Circular queues,Dequeue, Priority queues, Application of queues

UNIT IV (Trees I)
Basic Terminologies, Types of trees,traversingaBinary tree, Huffman tree Introduction, Operations on BST.Introduction and operations on AVL tree and applications

UNIT V (Trees II)
Introduction, &Properties of RedBlack Tree, Operations on RedBlack Tree, Application, Introduction &Properties of B Tree, Operations on B Tree, Application

UNIT VI (Graphs and Miscellaneous DS)
Introduction & Basic Terminologies,Directed Graphs Representation, BFS and DFS, Heap; Min and Max Heap, Introduction HashTables and Functions Types of Hash Functions, Trie, Skip List, Ordered Statistics, Interval Trees.

Refernce books:

1) Data Structures using C by ReemaThareja,
2) Introduction to Algorithms, by Cormen, Leiserson, Rivest, and Stein

NPTEL:

1) Dr. P PChakraborthy, IITkgp (Programming and Data Structure)
2) Dr. Pradip K Das, Dr. S.V. Rao ,IIT Guwahati (Data Structures and Program Methodology)
3) Prof. Naveen Garg ,IIT Delhi (Data Structures And Algorithms)

OUTCOMES:

After successful completion of the course, the learners would be able to

1. Define basic static and dynamic data structures: stack, queue, linked lists, trees, graphs, heap, priority queue, hash tables, sorting algorithms.
2. Demonstrate advantages and disadvantages of specific data structures.
3. Select basic data structures for autonomous realization of simple programs or program parts.
4. Determine and demonstrate bugs in program, recognise needed basic operations with data structures.
5. Formulate new solutions for programing problems or improve existing code using data structures
6. Evaluate data structures in terms of time and memory complexity of basic operations