Data Structure
Data Structure
[CORE COURSE]
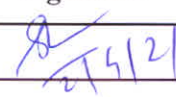
Semester: III	Credits: 3	Subject Code: BC32102	Lectures: 48

Course Outcomes:

At the end of this course, the learner will be able to,
- Recognize the concepts of ADTs .
- Analyze the various linear data structures – lists, stacks, and queues.
- Evaluate various sorting, searching and hashing algorithms.
- Apply the concepts of Tree and Graph structure.

Unit 1: Basic Concept and Introduction to Data Structure	5

- Pointers and dynamic memory allocation
- Algorithm-Definition and characteristics
- Algorithm Analysis -Space Complexity -Time Complexity - Asymptotic Notation Introduction to Data structure
- Types of Data structure
- Abstract Data Types (ADT) Introduction to Arrays and Structure
- Types of array and Representation of array
- Polynomial - Polynomial Representation - Evaluation of Polynomial - Addition of Polynomial
- Self Referential Structure

Unit 2: Searching and Sorting techniques	12

- Introduction to Arrays - array representation
- Sorting algorithms with efficiency - Bubble sort, Insertion sort, Merge sort, Quick Sort, Selection Sort
- Searching techniques –Linear Search, Binary search

Unit 3: Linear data structures- Linked List, Stack and Queue	24

- Introduction to Linked List
  - Implementation of Linked List – Static & Dynamic representation
  - Types of Linked List - Singly Linked list(All type of operation) - Doubly Linked list (Create , Display) - Circularly Singly Linked list (Create, Display) - Circularly Doubly Linked list (Create, Display)
  - Generalized linked list – Concept and Representation
- Introduction to Stack
  - Representation- Static & Dynamic
  - Primitive Operations on stack

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- o Application of Stack
- o Conversion of Infix, prefix, postfix, Evaluation of postfix and prefix
- o Simulating recursion using stack
- o Representation - Static & Dynamic
- o Primitive Operations on Queue
- o Circular queue, priority queue
- o Concept of doubly ended queue

Unit4: Non-Linear Data Structure-Trees	12

- Concept & Terminologies
- Binary tree, binary search tree
- Representation – Static and Dynamic
- Operations on BT and BST – create, Insert, delete, , counting leaf, non-leaf & total nodes
- Tree Traversals (preorder, inorder, postorder)
- Application - Heap sort
- Height balanced tree- AVL trees- Rotations, AVL tree examples
- Introduction to Graph

#12 hours for Library work, assignments practical or field work
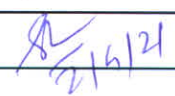
Recommended Text Books:

- Hitesh Gupta ,*Data Structure using C*, International Book House P. Ltd, 2013
- E Balagurusamy ,*Data Structure Using C* ,McGraw Hill Eduction, 2013

Reference Books:

- Sahni, *Fundamentals of Data Structure in C*,Universities Press Pvt.Ltd,2008
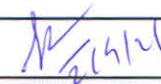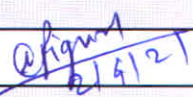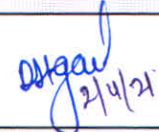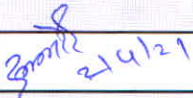- James A Storer ,*An Introduction to Data Structure and Algorithms* ,2009

Websites:
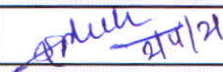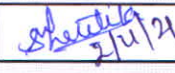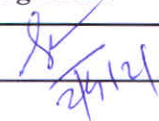
https://www.tutorialspoint.com/
www.w3schools.com

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Faculty*	Prof Monika Rajguru		
Faculty*	Asst. Prof. Deepali Gupta		
Subject Expert (Outside SPPU)	Dr. Sagar Jambhorkar		
Subject Expert (Outside SPPU)	Prof Sachin Bohite		
VC Nominee	Prof Anjum Patel		
Industry Expert	Ms Shrutika Wayal		
One Alumni***	Ms. Vidhi Thakkar		

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