19CS1202– DATA STRUCTURES

(Common to ECE & EEE)

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| **Course category:** | Core | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture – Tutorial – Practical:** | 3-0-3 |
| **Prerequisite:** | Basics of computer fundamentals, knowledge on programming | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course**  **Objectives** | Students undergoing this course are expected to understand: | |
| 1. Understanding the basics of data structures, types and their representation 2. Creating awareness on operations of various data structures. 3. Gaining knowledge about various data structures and its practical applications. 4. Study of different searching and sorting techniques. | |
| **Course Outcomes** | Upon successful completion of the course , the students will be able to: | |
| CO1 | Learn the fundamentals of Data Structures including the basics of Stack and its applicability. |
| CO2 | Study various types of Queues to develop various applications. |
| CO3 | Acquire the basics of Linked List representation and effective utilization of Linked lists in memory allocation. |
| CO4 | Learn the applications of Set data structure and Trees representations. |
| CO5 | Study various Graph representations and its applications. |
| CO6 | Learn various searching and sorting techniques. |
| **Course**  **Content**  **Course**  **Content** | **UNIT – I**  **INTRODUCTION –** Definition and concepts, Overview of Data Structures, Implementation of Data Structures.  **STACKS**: Introduction, Definition, Representation of a Stack using Arrays, Operations of Stacks, Application of queues.  **UNIT – II**  **Queues**: Introduction, Definition, Representation of Queues using Arrays, Various Queue Structures – Circular, Deque, Priority, Application – Round Robin Algorithm.  **UNIT – III**  **Linked Lists :** Definitions, Singly Linked List – representation and operations, Circular Linked List and double linked list, Operations on circular and double linked list.  **UNIT – IV**  **SETS**: Definitions and Terminologies, Representation and Operations of Set.  **TREES:** Basic Terminologies, Definitions and Concepts, Representations of a Binary Tree and Operations on binary tree.  **UNIT – V**  **GRAPHS**: Introduction, Graph Terminologies, Representation of Graphs, Operations – Linked List Representation, Illustration of Warshal, Dijikstra, Kruskal’s Algorithms.  **UNIT – VI**  **SORTING:** Basic Terminologies, Sorting Techniques – Bubble sort, Insertion sort, Simple Merge Sort.  **SEARCHING:** Basic Terminologies, Searching Techniques – Linear Search with array, Binary Search, Non – linear Search Techniques - Binary Search Tree Searching. | |
| **Text Books and Reference Books** | **TEXT BOOK:**   1. D. Samanta,”Classic Data Structures”, Prentice Hall of India, 2nd Edition 2009.   **REFERENCE BOOKS:**   1. S. Lipschutz, “Data Structures using C”, Tata McGraw Hill, Special Indian Edition 2012. | |
| **E-Resources** | 1. <https://nptel.ac.in/courses> 2. <https://freevideolectures.com/university/iitm> | |

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| Contribution of Course Outcomes towards achievement of Program Outcomes (3-High, 2-Medium, 1-Low) | | | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 3 | 2 | - | 3 | 3 | - | - | - | - | 3 | 3 | - | - |
| CO2 | 3 | 3 | 2 | - | 2 | 2 | - | - | - | - | 3 | 3 | - | - |
| CO3 | 3 | 3 | 3 | - | 3 | 2 | - | - | - | - | 3 | 3 | - | - |
| CO4 | 3 | 3 | 2 | - | 2 | 2 | - | - | - | - | 2 | 2 | - | - |
| CO5 | 3 | 3 | 2 | - | 2 | 3 | - | - | - | - | 2 | 2 | - | - |
| CO6 | 3 | 3 | 2 | - | 2 | 2 | - | - | - | - | 2 | 2 | - | - |