MCPC1007 DATA STRUCTURES (3-0-0)

Objectives:

- Course objectives reflect specific knowledge, skills, abilities, or competencies that instructors expect students to acquire from a particular course.
- Course objectives are often very specific and detailed statements that describe the content or skills that will be taught in the classroom.
- In some regards, course objectives can be thought of as inputs of student learning, representing the many important details that faculty members will cover during a particular course.

Course Outcomes(CO):

After successful completion of the course the student will be able to:

- CO1: To understand the role and application of Data Structure in real life.
- CO2: To develop abstract data types for solving the complex problems.
- CO3: To understand the concepts of non-linear data structure and application.
- CO4: To analyze the efficiency of algorithms.

CO5: To describe the concept of Graph Theory in detail.

Module-I

Fundamentals: Introduction to Data Structures, Classification of Data Structures, Algorithms, Measuring Space and Time Complexities, Asymptotic Notations, Abstract Data Types.

Arrays: Storage Structures for Arrays, Sparse Matrixes, Strings, Pattern Matching.

Linked Lists: Dynamic Memory Management, Single Linked Lists, Double Linked Lists, Circular Linked Lists, Operations on Polynomials.

Stacks and Queues: Representation, Linked Stacks and Queues, Operations on Stacks and Queues, Applications of Stack and Queues.

Module-II

Trees: Terminology, Representation, Binary Trees, Binary Search Trees, Searching, Insertion and Deletions Operations in a Binary Search Tree, Height Balanced Trees, M-way Search Trees, B-Trees, B+ Trees, General Trees, Representation of General Trees and Binary Trees, Forests, Application of Trees.

Module-III

Graphs: Terminology, Representation, Path Matrix, Graph Traversal, Shortest Path Problems, Topological Sort.

Searching and Sorting Techniques: Linear and Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, Heap and Heap Sort, Radix Sort, Comparison of Sorting Techniques.

Module-IV

Hashing: Hash Functions and Hashing Techniques. External sorting, Implementation using programming in C.

Books:

- 1. Data Structures Using C Aaron M. Tenenbaum
- 2. Tremblay, Jean-Paul, and Paul G. Sorenson, "An introduction to data structures with applications", McGraw-Hill, Inc., 1984.

- 3. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, 2008, Universities Press Pvt. Ltd. Hyderabad.
- 4. Seymour, Lipchitz. "Data Structures with C."TMH (2010).