

### Data Structures & Algorithms (ID) (IT – 3003)

Course Code	(ID) IT-3003	Credits-4	L -3, T-1, P-0
Name of the Course	Data Structures & Algorithms		
Lectures to be Delivered	52 (1 Hr Each) (L= 39, T = 13 for each semester)		
Semester End Examination	Max. Marks: 100	Min. Pass Marks: 40	Maximum Time: 3hrs
Continuous Assessment (based on sessional tests (2) 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)			Max. Marks: 50

#### Instructions

- For Paper Setters:** The question paper will consist of five sections A, B, C, D, and E. Section E will be Compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 40% of the total marks of the semester end examination for the course. Section A, B, C and D will have two questions from the respective sections of the syllabus and each question will carry 15% of the total marks of the semester end examination for the course.
- For Candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C and D of the question paper and all the subparts of the questions in section E. Use of non-programmable calculators is allowed.

#### Section- A

Basic concepts and notions, data structures and data structure operation, mathematical notation and functions, algorithmic complexity, linked list, representation of linked list, multi-linked structures.

#### Section B

Trees- definitions and basic concepts, linked tree representation, representation in contiguous storage, binary trees, binary trees traversal, searching, insertion and deletion in binary trees, heap trees and heap sort algorithm, Height balanced trees and AVL trees.

#### Section C

Graphs and their application, sequential and linked representations of graph, adjacency matrix, operation on graph, traversing a graph, Dijkstra's algorithm for shortest distance.  
Tables, searching sequential tables, Hash tables and symbol tables

#### Section D

Searching and Sorting: Use of various data structure for searching and sorting, linear and binary search, insertion sort, selection sort, merge sort, radix sort, bubble sort

#### Note:

- Programs are to be implemented in C
- Insertion, deletion, search and traversal operation are to be performed on all the data structures.

#### Books:

- Tenenbaum, A. Langsam, Y and Augensatein, A. J: Data structures using C, Prentice Hall of India
- Seymour Lipschutz: Theory and practice of Data structure, Mc. Graw Hill 1988
- Horowitz E and Sahni S: Data Structure with Pascal, 3<sup>rd</sup> Edition, Galgotia, 1991