CORE COURSE IV: 3B04CSC DATA STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
3	3B04CSC	4	4	3

COURSE OUTCOME

CO1: Able to analyze the complexity of algorithm.
CO2: Familiar with linear and nonlinear data structures.
CO3: Acquire the ability to select appropriate data structure for a given problem.
CO4: Obtain skill for systematic approach to programming.

Unit I:

Elementary Data Organization, Data Structures, Data Structure Operations. Classification of Data Structures; Linear Arrays - operations – Application: Polynomial- Representation with arrays; Polynomial addition ; Stack – Operations, Application: Evaluation of post fix expression ; Queue – Operations, Printer Queue as application, Circular Queue, Deque, Priority Queue; Linked Lists: Definition, Representation of Linked List in memory, Traversing Linked List, Searching a linked list, Memory Allocation and Garbage Collection , Insert into a linked list, Deletion from a linked list; Header Linked Lists; Two-way Lists – Operations.

(20 Hrs)

Unit II:

Trees – Binary Trees, Complete Binary trees, Extended Binary trees; Representing Binary trees in memory, Traversing Binary trees, Binary search trees – Searching and inserting in Binary Search Trees, Deleting in a Binary Search Tree, Heap – Heap sort, Huffman's Algorithm; General Trees – Computer representation of general trees.

(16 Hrs)

Unit III:

Graphs – Graph Theory terminology; Sequential Representation of Graphs – Adjacency Matrix, Path Matrix ; Operations on graph – searching, inserting, deleting, traversing: Breadth- First Search and Depth First Search.

(16 Hrs)

Unit IV:

Design and Analysis of Algorithms: From Problems to Programs - Algorithms, Pseudo-Language and Stepwise Refinement; Abstract Data Types- Definition of Abstract Data Type, Data Structures and Abstract Data Types; The Running Time of a Program - Measuring the Running Time of a Program, Asymptotic Notations – Big O, Omega, Theta. Search: Linear and Binary search; comparison of searching algorithms. Sort: Insertion, bubble, selection, quick and merge sort; Comparison of Sort algorithms.

(20 Hrs)

Books for Study:

1. Schaum's Outline of Theory and Problems of Data Structures – SymourLipschutz – Mc-Graw Hill Book Company.
2. Data Structures and Algorithms- Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman – Pearson Education.

Books for Reference:

1. Data Structures and Algorithms: Concepts, Techniques and Applications; GAV Pai, McGraw Hill, 2008.
2. Data Structures in C, Achuthsankar and Mahalekshmi, PHI, 2008
3. Fundamentals of Data structures in C++, 2nd Edn, Horowitz Sahni, Anderson, Universities Press
4. Classic Data structures, Samanta, Second Edition, PHI

Marks including choice:

Unit	Marks
I	19
II	11
Ill	11
IV	19