DEPARTMENT: COMPUTER SCIENCE AND ENGINEERING
COURSE CODE: CSPC-205
COURSE TITLE: DATA STRUCTURES AND ALGORITHMS
COURSE DESIGNATION: REQUIRED
PRE-REQUISITES: NONE
CONTACT HOURS/CREDIT SCHEME: (L-T-P-C: 3-1-0-4)
COURSE ASSESSMENT METHODS: Two sessional exams and one end-semester exam, along with assignments, presentations and class tests which may be conducted by the course coordinator in lieu of internal assessment.

COURSE OUTCOMES
After the completion of the course, the students will be able to:

1. Understand the concepts of data structure, data type and array data structure.
2. Analyze algorithms and determine their time complexity.
3. Implement linked list data structure to solve various problems.
4. Understand and apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C-programming language.

Course Outcomes	Program outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CSPC-205												
CO 1.	M	L	H	L								
CO 2.		H	M	M	L		M	M				
CO 3.		M	M									
CO 4.		M	H	L	L							

TOPICS COVERED

Introduction: Basic Terminology, Elementary Data Organization, Structure operations, Algorithm Complexity and Time-Space trade-off

Arrays: Array Definition, Representation and Analysis, Single and Multidimensional Arrays, address calculation, application of arrays, Character String in C++, Character string operation, Array as Parameters, Ordered List, Sparse Matrices and Vectors.

Stacks: Array Representation and Implementation of stack, Operations on Stacks: Push & Pop, Array Representation of Stack, Linked Representation of Stack, Operations Associated with Stacks, and Application of stack: Conversion of Infix to prefix and Postfix Expressions, Evaluation of postfix expression using stack.

Recursion: Recursive definition and processes, recursion in C, example of recursion, Tower of Hanoi Problem, simulating recursion, Backtracking, recursive algorithms, principles of recursion, tail recursion, removal of recursion.

Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues**.**

Linked list: Representation and Implementation of Singly Linked Lists, Two-way Header List, Traversing and Searching of Linked List, Overflow and Underflow, Insertion and deletion to/from Linked Lists, Insertion and deletion Algorithms, Doubly linked list, Linked List in Array, Polynomial representation and addition, Generalized linked list, Garbage Collection and Compaction.

Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees, Array and Linked Representation of Binary trees, Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm**.**

Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, Path Length, AVL Trees, B-trees.

Searching and Hashing: Sequential search, binary search, comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.

Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting**.**

Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees.

File Structures: Physical Storage Media File Organization, Organization of records into Blocks, Sequential Files, Indexing and Hashing, Primary indices, Secondary indices, B+ Tree index Files, B Tree index Files, Indexing and Hashing Comparisons.

TEXT BOOKS, AND/OR REFERENCE MATERIAL

1. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Pvt. Ltd., New Delhi.
2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi-2002
3. A. M. Tenenbaum, "Data Structures using C & C++", Prentice-Hall of India Pvt. Ltd., New Delhi.
4. Bruno R Preiss, "Data Structures and Algorithms with Object Oriented Design Pattern in C++", Jhon Wiley & Sons, Inc.
5. GilbergForozan , "Data Structure – A pseudo code approach with C++", Cengage Learning, New Delhi.

DEPARTMENT: COMPUTER SCIENCE AND ENGINEERING
COURSE CODE: CSPC-207
COURSE TITLE: COMPUTER NETWORKS
COURSE DESIGNATION: REQUIRED
PRE-REQUISITES: NONE
CONTACT HOURS/CREDIT SCHEME: (L-T-P-C: 3-0-0-3)
COURSE ASSESSMENT METHODS: Two sessional exams and one end-semester exam, along with assignments, presentations and class tests which may be conducted by the course coordinator in lieu of internal assessment.

COURSE OUTCOMES
After the completion of the course, the students will be able to:

1. Understand basic computer network technology, data communications System and its components.
2. Identify the different types of network topologies and protocols, to enumerate the layers of the OSI model and TCP/IP
3. Identify the different types of network devices and their functions within a network.
4. Understand and build the skills of subnetting and be familiar with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.

Course Outcomes	Program outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CSPC-207												
CO 1.			M		M							
CO 2.	M	H					M					
CO 3.			M		M							
CO 4.			H		M	M						

TOPICS COVERED

Introduction: Goals and Applications of Networks, Network structure and architecture, OSI reference model, TCP/IP Protocol suite, Layering principles, Network Topology Design, connecting devices, Physical Layer Transmission Media, Line coding scheme, Basic idea of modulation and multiplexing, Switching methods.