(ख) पाठ्यक्रम

Section 1: Data Base Management Systems

Database Environment: Basic Concepts, Advantages of Database approach, Comparison with Traditional file systems, DBMS Architecture, Database Users, Data Models and Schemas, Database languages and Interfaces; Database development process: Development Lifecycle, Types of Application.

Introduction to Data Modeling, Modeling the rules, Entity Relationship Model, ER Model Constructs- Attributes, Relationship etc., Enhanced ER Model and Business Rules, Modeling Introduction to SQL – Inserting , Updating, and Deleting data, Processing Single Tables, Processing Multiple Tables, PL/SQL Constructs - Views, Triggers, Cursors etc; Transaction Processing – Properties, Schedules and Serializability Issues. Concurrency Control – Introduction, Locking and Time Stamping Issues etc.

Section 2:Computer Networks

Introduction, topology, OSI model, Concept of layering, *Communication Media,*LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi

Section 3: Data Structures and Algorithms

Abstract data types, Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, AVL trees, search trees, graphs, Types of graph, Representation of graph in memory, applications.

Introduction to algorithms, Searching, sorting,Algorithms analysis, best, average, and worst case analysis.Asymptotic complexity, asymptotic notation. Algorithm design usingdivide - and - conquer, and greedy approach.

Section 4:Operating Systems and Software Engineering

Operating System: Introduction, types of operating systems, Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory.

Information Systems and Software Engineering:information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project.

Section 5:Programming Skills

Introduction to the C Language:

The C Language and its Advantages – The Structure of a C Program - Data Types, Variables, Constants - Operands, Operators, and Arithmetic Expressions - Input/ Output Management - The getchar() and putchar() Functions – Single - character I/O – string I/O - Formatted Input and output Function.

Introduction - goto statement – If - else statement - nested if - else statement – switch statement - for loop - nested for loop - while loop – do - while loop – break statement - continue statement - exit() function. Functions: Introduction - Call by Value and Call by Reference – return values – recursion – Arrays - Introduction to Arrays - Initialization of Array - Multi dimensional. Pointers – Introduction – definition - address operator - pointer variables - pointers to pointers - pointers and arrays: - pointers and functions – Files – Introduction – File Structure - File handling functions - File Types - Error Handling – Structure – Introduction – declaring – initialization

Introduction to OOP, Class & Objects:

Object Oriented Programming Paradigm - Basic Concepts of OOP - Benefits of OOP - Object Oriented Languages - Features of OOP - How OOP Differ from Procedure Oriented Programming - applications of OOP - structure of C++ Program - basic Data Types in C++ - Operators in C++ - Scope Resolution Operator - Member Dereferencing Operators – memory management operators - Introduction of Classes - Inline member functions – Objects - Arrays of Objects - Objects as Function Arguments - Static data member and static member functions – Constructors - Parameterized Constructors – Default Argument constructors – Copy Constructors – Destructors – Friend functions.