Phase-I

Programming Languages:

- **C++ :** Introduction and Basic I/O, Variables , Operators, Loops, Arrays, String , Functions, Pointers and Dynamic Memory Allocation
- **Java :** Introduction and Basic I/O, Variables , Operators, Loops, Arrays, String , Immutable Strings, ArrayList , BigInteger

Note: Due to time constraints, you may choose any one programming language of your choice for the course.

Object Oriented Programming:

- Classes and Objects
- Inheritance and Polymorphism : Overloading and Overriding
- Abstraction and Encapsulation
- Access Modifiers
- Friend and Virtual functions in C++
- static, final, this and super keywords and Interfaces in Java

Data Structures and Algorithms:

- Mathematics
- Basic Recursion
- **Arrays:** Searching, Sorting, Deleting, Shift, Rotation, Prefix Sum...
- **Bit Magic**
- **Matrix:** Search, Delete, Insert, Rotate...
- **Searching:** Linear Search, Binary Search, Two pointer approach...
- **Sorting:** QuickSort and its variation, Mergesort, Counting sort, Insertion Sort, Heap Sort, Comparator
- **Hashing:** Different Types of Hashing Techniques, Collision resolution Techniques, Hashing Questions
- **Strings:** Basic Operations, Naive Pattern Search, Other searching algorithms.
- **Linked Lists:** Singly Linked List, Doubly Linked Lists, Circular Linked List, Skip List, Doubly Circular

- **Stacks:** Stack Operations, Implementation, Different Questions
- **Queues:** Queue Operations, Implementation, Different Questions, Deque Operations, Implementation, Different Questions.
- **Tree:** Binary Tree, Tree Traversal
- **Binary Search Tree:** Search, Insert, Delete and other important questions, AVL (Basic Introduction)
- **Heaps:** Binary Heap, Questions based on heaps.
- **Graphs:** Types of Graphs, BFS, DFS, Cycle Detection, Connected Components, Bipartite Graph
- **Recursion and Backtracking:** Backtracking questions, n queen, rat, knight etc.
- **Dynamic Programming:** Properties (Top Down, Bottom Up, Optimal Substructures, Overlapping Subproblems).
- **Graph Algorithms :** Shortest Path Algorithms, Connected Components, Bridges
- **Advanced DS -** Trie, Segment Tree, Disjoint Set

Object Oriented Analysis and Design

- Elevator Design
- Parking Lot Design
- Tiny URL Design
- Bookmyshow Design
- Design Chess
- Design Online book reader system

Operating System

- Operating System and its Types
- Multiprogramming, Multiprocessing, Multithreading
- Process Management
- Process Scheduling
- Inter-process communication.
- Multi-threaded programming.
- Process Synchronization.

- Deadlock
- Deadlock Recovery
- Memory Management
- Virtual Memory

Database Management System

- Introduction to DBMS
- Architectures
- ER Model
- Relational Model
- Keys in Relational Model
- Database Normalization
- Normal Forms
- Concurrency Control
- Indexing in Database
- B+ Tree Introduction
- SQL

Computer Networks:

- Introduction to Computer Networks
- Transmission Modes
- Network Topologies
- TCP/IP vs OSI Model
- Circuit Switching vs Packet Switching
- Flow Control Protocols
- Error Detection
- IP and Classful Addressing
- Classless Addressing
- IPv4 vs IPv6
- Routing Protocols

- ARP & Reverse ARP
- Transport Layer
- TCP & UDP
- Application Layer

Phase-II

Aptitude and Reasoning

- Quantitative
- Logical Reasoning
- Verbal

Personality Development:

- Soft Skills Tips
- HR Round Questions
- Resume Building Guide