CSE357:COMBINATORIAL STUDIES

L:2 T:0 P:2 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: understand the fundamental computer science concepts, including data structures, algorithms, databases, operating systems, and computer networks, essential for technical interviews.

CO2 :: assess the problem-solving skills specific to coding challenges and algorithmic problems frequently encountered in technical interviews.

CO3 :: articulate a comprehensive command of Object-Oriented Programming principles, enhancing readiness to excel in technical interviews

CO4 :: gain comprehensive strategies and techniques to effectively prepare for technical interviews, including mock interviews, resume building, and effective communication during interviews.

CO5 :: impart the requisite knowledge and skills to confidently address technical interview inquiries posed by service-oriented IT companies, demonstrating proficiency across diverse technical domains.

CO6 :: prepare and practice sessions including mock interviews, whiteboard coding exercises, and simulations of behavioural interview scenarios, fostering confidence and preparedness for different stages of technical interviews.

Unit I

Operating System Basics : Foundations of Operating Systems, Types of Operating Systems, Memory Management, Job Scheduling and Process Loading, Processor Scheduling Algorithms, Process Synchronization and Inter-process Communication, Resource Management, Disc structure and Scheduling, Protection mechanisms

Unit II

Computer Networking Basics : Foundations of Computer Networks,, Elements and Types of Networks,, Data and Signals,, Network Topologies and Transmission Medium,, Network Models and Protocols,, Understanding OSI and TCP/IP Models,, Working of TCP/IP Model (Internet),, Subnetting and Routing,, Key Protocols: HTTP, SMTP, POP/IMAP, FTP, DNS, DHCP,, Overview of Traceroute and Ping

Unit III

Database Management Systems (DBMS) : Introduction to Databases and RDBMS,, Basics of Databases and RDBMS,, Data Definitions: Tables, Fields, Records,, SQL and Data Manipulation,, Database Keys and Data Integrity,, Database Normalization and Transactions,, Fundamentals of Normalization,, Transaction Management in DBMS

Unit IV

Fundamentals of Programming Languages : C/C++/Java Interview Questions Overview,, Variables, Data Types, and Memory,, Pointers and Storage, Classes,, Introduction to Object-Oriented Programming (OOP),, Compiler and Interpreter Basics,, Understanding Process Loading and Linking,, Techniques of Parameter Passing and Binding,, Storage Organization and Storage Classes,, Advanced OOP Concepts and Data Structures, Abstract Data Types (ADTs),, Data Structure Principles,, Advanced Programming Techniques,, Memory Handling in OOP Languages

Unit V

Algorithms and Data Structures : Understanding Algorithms and Analysis,, Running Time Analysis and Rate of Growth,, Asymptotic Notation: Big-O Notation,, Data Structures and Recursive Algorithms,, Recursion and Backtracking,, Linked Lists,, Stacks and Queues,, Trees and Binary Search Trees (BSTs)

Unit VI

Advanced Algorithms and Problem-Solving Techniques : Sorting and Searching Algorithms,, Classification and Comparison of Sorting Algorithms,, Linear and Non-Linear Searching Techniques,, Hashing and Hash Table Implementation,, Graph Algorithms and Design Strategies,, Graph Representation and Traversals,, Shortest Path Algorithms,, Introduction to Greedy,, Divide and Conquer,, Dynamic Programming Strategies

List of Practicals / Experiments:

List of Practicals

- 1. Introduction to Linux Commands
- 2. Shell Programming
- 3. System Calls (File / Directory/ Process)
- 4. Multi Thread Process using Pthread Library
- 5. SQL Commands (DDL/DML/ TCL)
- 6. PL/SQL Triggers, Procedures, Functions
- 7. Subnetting
- 8. Arrays and Linked List
- 9. Stacks and Queues
- 10. Trees and Binary Search Trees

Text Books:

1. IT INTERVIEW QUESTIONS by NARASIMHA KARUMANCHI, CAREERMONK PUBLICATIONS

References:

1. CRACKING THE CODING INTERVIEW by MCDOWELL GAYLE LAAKMANN, CAREERCUP

2. CRACKING THE IT INTERVIEW by M BALASUBRAMANIAM, K. R BAALAJI, KIRAN. G RANGANATH, NANDAWAT RAVINDRA K, M SELVAGURU, T COMERICA SUBASH, RAGHAVAN S VENKAT, S ANBAZHAGAN VIKRAM, MC GRAW HILL

3. SQL IN 10 MINUTES, SAMS TEACH YOURSELF by BEN FORTA, SAMS PUBLISHING

4. MCQS IN COMPUTER SCIENCE by TIMOTHY WILLIAMS, MC GRAW HILL