

Placement material for 2024 Core subjects

Computer Subjects:

week-1(3days or 6days):

Day 1: Introduction to Operating Systems

Morning – Fundamentals:

1. What is an Operating System? Understand the basic purpose and functions of an OS.
2. Types of Operating Systems: Learn about various OS types like Windows, macOS, Linux, and mobile OSs.
3. Kernel: Explore the kernel's role in managing hardware resources.
4. User Interfaces: Understand different types of user interfaces, including command-line and graphical interfaces.

Afternoon – Process and Memory Management: 5. Processes: Learn about processes, their creation, and management by the OS.

6. Threads: Understand threads and their use for concurrent programming.
7. Memory Management: Explore how OS manages physical and virtual memory.
8. File Systems: Learn about file systems and their organization of data.

Day 2: OS Components and Scheduling

Morning – File Systems and I/O: 9. File Operations: Study file operations like reading, writing, and file permissions.

10. Input/Output (I/O): Understand how the OS handles input and output devices.
11. Disk Management: Learn about disk management and storage technologies.

Afternoon – Process Scheduling and Security: 12. CPU Scheduling: Explore process scheduling algorithms like FCFS, Round Robin, and Priority Scheduling.

13. Multitasking and Multiprocessing: Understand how OS handles multiple processes and CPUs.
14. Security and Permissions: Learn about user authentication, authorization, and security mechanisms.

Day 3: Networking and Advanced Topics

Morning – Networking and Device Management: 15. Networking: Get an overview of networking in OS, including protocols and networking stack.

16. Device Management: Learn how OS manages hardware devices, drivers, and interrupts.

week-2(3days):

Day 1: Introduction and ER & Relational Models

Morning – Introduction to DBMS:

1. What is a Database Management System (DBMS)? Understand the importance and role of DBMS.
2. Types of DBMS: Learn about different types of DBMS, with a focus on relational databases.
3. Key Concepts: Get familiar with key terms like tables, records, fields, and primary keys.

Afternoon – Entity-Relationship (ER) Model: 4. ER Model Basics: Learn about entities, attributes, relationships, and cardinality in the ER model.

5. ER Diagrams: Practice creating simple ER diagrams for real-world scenarios.
6. Relational Model: Understand how the ER model is mapped to the relational model with tables and keys.

Day 2: Database Design and File Structures

Morning – Database Design (Normal Forms): 7. Normalization: Study the concepts of database normalization, from 1NF to 3NF.

8. Normalization Examples: Work through examples to normalize a set of data.
9. Denormalization: Understand when and why denormalization may be necessary.

Afternoon – File Structures and Indexing: 10. File Structures: Learn about file organization methods, including sequential, indexed, and hashed.

11. Indexing: Explore indexing techniques like B-trees and hash indexes for efficient data retrieval.



Day 3: Transactions and Concurrency Control

Morning – Transactions: 12. Introduction to Transactions: Understand the concept of a database transaction.

13. ACID Properties: Learn about the ACID properties (Atomicity, Consistency, Isolation, Durability) that transactions should maintain.

14. Transaction Management: Study how transactions are managed in a DBMS.

Afternoon – Concurrency Control: 15. Concurrency Issues: Understand problems like data inconsistency and race conditions in multi-user environments.

16. Concurrency Control Methods: Explore concurrency control techniques like locking, timestamp-based protocols, and two-phase locking.

Review and Further Learning: 17. Review: Go over what you've learned during these three days and practice with sample problems.

week-2(3days or 1week):

Day 1: SQL Fundamentals

Morning – SQL Basics:

1. Introduction to SQL: Understand what SQL is and why it's important in databases.
2. Setting Up: Install a database system like MySQL, PostgreSQL, or SQLite.
3. Basic Queries: Learn to write simple SQL SELECT statements to retrieve data from a database.
4. Filtering Data: Use the WHERE clause to filter results based on specific conditions.
5. Sorting Data: Employ the ORDER BY clause to sort data in various ways.
6. Aggregating Data: Use functions like COUNT, SUM, AVG, MIN, and MAX to perform basic calculations on data.

Afternoon – Database Design: 7. Tables and Schemas: Understand how to create tables and organize them into schemas.

8. Data Types: Learn about common data types like INT, VARCHAR, DATE, and BOOLEAN.

9. Primary Keys: Define primary keys to uniquely identify rows in a table.

10. Foreign Keys: Understand foreign keys for establishing relationships between tables.

Day 2: Advanced SQL

Morning – Joins and Relationships: 11. INNER JOIN: Learn how to join data from multiple tables using INNER JOIN.

12. LEFT JOIN and RIGHT JOIN: Understand these types of outer joins to retrieve data with or without matches.

13. Subqueries: Use subqueries to nest one query within another for more complex data retrieval.

14. Self-Joins: Discover how to join a table with itself for recursive or hierarchical data.

15. Relationships: Understand different types of relationships like one-to-many and many-to-many.

Afternoon – Data Modification and Transactions: 16. INSERT, UPDATE, DELETE: Learn to insert, update, and delete data in tables.

17. Transactions: Understand the concept of transactions and how to use COMMIT and ROLLBACK

Day 3: SQL Best Practices and Beyond

Morning – Optimization and Best Practices: 18. Indexing: Learn about indexing to improve query performance.

19. Normalization: Understand the basics of database normalization for efficient data storage.

20. Constraints: Implement constraints like UNIQUE and CHECK for data integrity.

21. Views: Create and use views to simplify complex queries.

Afternoon – Beyond Basics: 22. Stored Procedures: Learn about stored procedures for encapsulating SQL code.

23. Triggers: Understand triggers and their uses in database automation.

24. Security: Explore database security best practices, including user roles and permissions.

25. Backups and Recovery: Get a brief overview of database backup and recovery.

