SQL, DATABASE MANAGEMENT AND DATA WAREHOUSING TRAINING COURSE

Introduction

This programme equips participants with the skills required to retrieve, organize, manage and analyse data stored in relational databases. It covers SQL fundamentals, database design, table relationships, data manipulation, query optimization, database administration and data warehousing concepts. Participants learn to write SQL queries that retrieve relevant information, combine datasets, summarize results and support organizational reporting. The course examines database normalization, primary and foreign keys, transactions, permissions, backup and recovery, and the principles of maintaining reliable database environments. It also introduces data warehouse architecture, ETL processes, analytical data structures and the distinction between operational databases and analytical platforms. Practical examples can be adapted to systems such as Microsoft SQL Server, PostgreSQL or MySQL.

Course Objectives

- Explain relational database concepts and database management principles.
- Create and manage database tables and relationships.
- Write SQL queries to retrieve, filter, combine and summarize data.
- Apply data definition and data manipulation commands.
- Develop normalized database structures for business applications.
- Perform basic database administration, security and recovery tasks.
- Explain data warehousing, ETL processes and analytical data models.

Course Modules

> Module 1: Database Management Fundamentals

- Database concepts, purposes and business applications.

- Relational database management systems and database architecture.
- Tables, records, fields, data types and constraints.
- Primary keys, foreign keys and referential integrity.

> Module 2: SQL Fundamentals and Data Retrieval
- SQL syntax, statements and query structure.
- SELECT, FROM, WHERE and ORDER BY clauses.
- Filtering records with comparison and logical operators.
- DISTINCT, aliases, sorting and limiting query results.

> Module 3: Data Manipulation and Table Management
- INSERT, UPDATE and DELETE operations.
- CREATE, ALTER and DROP statements.
- Data types, constraints and default values.
- Transactions, data consistency and safe modification practices.

> Module 4: SQL Joins and Relationships
- INNER JOIN and matching records across tables.
- LEFT JOIN, RIGHT JOIN and FULL OUTER JOIN concepts.
- Self-joins, multiple-table joins and relationship analysis.
- Identifying unmatched records and resolving join errors.

> Module 5: Aggregation and Advanced SQL Queries
- COUNT, SUM, AVG, MIN and MAX functions.
- GROUP BY and HAVING clauses.
- Subqueries, common table expressions and derived tables.
- Window functions, ranking and analytical calculations.

> Module 6: Database Design and Normalization
- Requirements analysis and conceptual database design.
- Entity-relationship diagrams and relational modelling.
- First, second and third normal forms.
- Denormalization considerations and database design trade-offs.

> Module 7: Database Administration and Security
- Database users, roles, permissions and access control.
- Authentication, authorization and least-privilege principles.
- Backup, restoration and recovery procedures.

- Database monitoring, maintenance and operational documentation.

> Module 8: Query Performance and Optimization
- Query execution plans and performance fundamentals.
- Indexing concepts and their impact on retrieval speed.
- Efficient joins, filtering and query restructuring.
- Identifying slow queries and monitoring database performance.

> Module 9: Data Warehousing and ETL
- Operational databases versus analytical data warehouses.
- Data warehouse architecture and staging environments.
- Extract, transform and load processes.
- Fact tables, dimension tables and star-schema design.

> Module 10: Integrated Database and Analytics Project
- Designing a relational database for a selected business process.
- Creating tables, relationships and integrity constraints.
- Writing SQL queries to generate management information.
- Developing a simple analytical dataset and documenting the solution.