40364 Database Administration Fundamentals

Course Description

This course provides a comprehensive introduction to SQL Server, covering core database concepts, data manipulation, and administration. Participants will gain practical experience in designing, querying, and managing databases using T-SQL. The program emphasizes hands-on exercises, ensuring learners can apply their knowledge in real-world scenarios.

Duration : 32 hours

Learning Objectives :

By the end of this course, learners will:

1. Understand fundamental database concepts, including relational databases and normalization.
2. Apply T-SQL to create and manipulate database objects efficiently.
3. Write queries to retrieve, insert, update, and delete data while ensuring integrity.
4. Optimize data storage using indexes and keys for improved performance.
5. Implement database security measures and perform backup/restore operations.

Pre-requisites

- **Basic understanding of computing concepts** (e.g., files, data storage)
- **Familiarity with any programming language** (helpful but not required)
- **No prior SQL knowledge needed**

Course Content :

Module 1: Understanding Core Database Concepts

- **Understanding data storage in tables**
    - Structure: columns (fields) and rows (records)
- **Relational database concepts**
    - Definition and importance of RDBMS
    - Establishing relations between tables
- **Data Manipulation Language (DML)**
    - Purpose and role in databases
- **Data Definition Language (DDL)**
    - Using T-SQL to create database objects (tables, views)

Module 2: Creating Database Objects

- **Choosing data types**
    - Importance and impact on storage requirements
- **Creating tables**
    - Purpose of tables
    - Using ANSI SQL syntax
- **Creating views**
    - When and why to use views
    - Using T-SQL or graphical designers
- **Creating stored procedures and functions**

- Operations: SELECT, INSERT, UPDATE, DELETE

Module 3: Manipulating Data

- **Selecting data**
  - Using SELECT queries to extract data
  - Utilizing joins, UNION, INTERSECT
- **Inserting data**
  - Using INSERT statements
- **Updating data**
  - Writing updated data using UPDATE statements
- **Deleting data**
  - Removing data from single or multiple tables
  - Maintaining referential integrity with transactions

Module 4: Understanding Data Storage

- **Normalization**
  - Reasons and five common levels
  - Normalizing to third normal form
- **Primary, foreign, and composite keys**
  - Role in databases
  - Choosing appropriate data types
  - Relationships between foreign and primary keys
- **Indexes**
  - Clustered and non-clustered indexes

Module 5: Administering a Database

- **Database security concepts**
  - Securing database objects
  - User accounts and roles
- **Database backups and restore**
  - Backup types: full, incremental
  - Importance of backups
  - Restoring a database