Mastering SQL and Power Query for Data Analytics

Course Description

This comprehensive program equips data analysts and BI developers with in-depth SQL and Power Query skills to streamline data preparation and reporting. Participants will master query construction, data transformation, and performance tuning to accelerate insights. Through hands-on demos and real-world exercises, attendees will deliver clean, reliable datasets and automated workflows that drive business decisions.

Duration : 40 hours (5 days)

Learning Objectives

1. Construct complex SQL queries using joins, subqueries, and window functions.
2. Create and manage database objects: tables, views, indexes, and constraints.
3. Analyze query performance via execution plans and optimize with indexing strategies.
4. Shape and combine data in Power Query: merges, appends, pivots, and custom columns.
5. Develop reusable M functions and parameterized queries for automation.
6. Build end-to-end data refresh pipelines integrating SQL and Power Query.
7. Troubleshoot data quality issues with error handling and profiling tools.
8. Publish data models and reports in Power BI with scheduled refreshes.

Pre-requisites

- Familiarity with relational database concepts
- Comfortable with Excel data manipulation

Content Coverage

Module 1: SQL Fundamentals & Environment Setup

- Installing and configuring SSMS/Azure Data Studio
- Connecting to databases and exploring metadata
- Writing basic SELECT, FROM, and WHERE clauses
- Sorting and limiting result sets
- Saving and sharing query files

Module 2: SQL Data Filtering & Sorting

- Using comparison and logical operators
- Pattern matching with LIKE
- IN, BETWEEN, and NULL checks
- ORDER BY with multiple columns
- Practical filtering scenarios [DEMO]

Module 3: Aggregations & Grouping

- Applying COUNT, SUM, AVG, MIN, MAX

- GROUP BY syntax and HAVING filters
- Rollup and cube operations
- Combining aggregate and non-aggregate columns
- Real-world summarization exercises [DEMO]

Module 4: Joins & Subqueries

- INNER, LEFT, RIGHT, and FULL joins
- Cross joins and self-joins
- Inline vs. correlated subqueries
- EXISTS, NOT EXISTS patterns
- Multi-table join optimization

Module 5: Window Functions & Analytics

- ROW_NUMBER(), RANK(), DENSE_RANK()
- Moving averages with OVER()
- PARTITION BY for segmented analytics
- CUME_DIST, NTILE for distribution analysis
- Time-series ranking examples [DEMO]

-Module 6: Data Modification & Transactions

- INSERT, UPDATE, DELETE statements
- MERGE for upsert scenarios
- Transaction control: COMMIT, ROLLBACK
- Error handling with TRY/CATCH
- Auditing changes via OUTPUT clause

Module 7: Schema Design & Indexing

- Defining primary and foreign keys
- Creating clustered and non-clustered indexes
- Index fill factor and maintenance
- Statistics and update strategies
- Index tuning case studies [DEMO]

Module 8: Intro to Power Query & M Language

- Power Query interface overview
- Differentiating Query Editor vs. M code
- Basic M expressions and let/in structure
- Query dependencies and load settings

Module 9: Data Connections & Import

- Connecting to SQL Server, Excel, CSV, and web sources [DEMO]
- Credentials and privacy levels
- Native database query vs. import modes
- Handling incremental data loads

Module 10: Basic Data Shaping

- Filtering rows and selecting columns
- Sorting and removing duplicates
- Replacing values and data types
- Grouping and summarizing tables

Module 11: Combining Queries

- Merging queries (left, inner, full) [DEMO]
- Appending tables for union scenarios
- Join kinds and performance considerations
- Real-time merge use cases

Module 12: Advanced Transformations

- Pivot and unpivot operations
- Conditional columns and custom formulas
- Extracting data from structured columns
- Date/time and text transformations

Module 13: Parameterization & Function Creation

- Defining query parameters
- Building reusable M functions
- Invoking functions in queries
- Dynamic data source switching

Module 14: Data Cleaning Techniques

- Filling down/up and replacing errors [DEMO]
- Splitting and merging columns
- Using fuzzy matching for deduplication
- Profiling data quality with Column Statistics

Module 15: Integrating SQL & Power Query

- Pushing transformations to the source vs. client side
- Native query folding concepts

- Embedding SQL statements in Power Query
- Optimizing hybrid workflows [DEMO]

Module 16: Automating Refresh & Workflows

- Setting up scheduled refresh in Power BI Service
- Parameterize refresh credentials
- Incremental refresh vs. full refresh strategies
- Monitoring refresh history and alerts

Module 17: Error Handling & Performance Tuning

- Diagnosing slow queries in M code
- Buffering and query folding best practices
- Handling timeouts and credential errors
- Performance benchmarking

Module 18: Reporting with Power BI

- Loading prepared tables into Power BI Desktop
- Building visuals: tables, charts, and slicers [DEMO]
- Managing relationships and star schemas
- Creating bookmarks and tooltips

Module 19: Real-World Scenario Workshop

- End-to-end project: ingest, transform, report [DEMO]