Querying & Manipulating Data Using

SQL

Module 1 – Introductory Level

Module 2 – Advanced Level

Foreword

The course is designed from an Analytics context where an Insight Analyst or a Data-Scientist is required to tackle (query and manipulate) vast amount of Data to deduce patterns and actionable insights. The course will be spread across 4 weeks (twice every week) including 38 hours of Instructor led sessions. Equal weightage will be given to Introductory Level and Advanced Level learners. Students can opt to choose either or both modules based on their needs. A large Dataset will be used to teach the concepts of SQL. Each concept will have exercises to further the learning. After the end of each module, there will be an assignment on a real dataset which will have to be completed within 2 weeks. A certificate of completion will be provided detailing the level of competence and which areas need more focus, if any.

Course Content

Module 1: Introductory Level

Module 1 will be taught in Weeks 1 & 2 in 4 separate days with each session lasting 4 hours.

Module 1: Week 1: Day 1 (M1.W1.D1) – 4.5 hrs

M1.W1.D1.1 Prep Work (60 min)

- Installing SQL Server Management Service
- Attaching Database for the Module
- Exploring the Object Explorer
- Concept of Database and Tables

M1.W1.D1.2 Introduction to Data Structure (30 min)

- How is Data Stored?
- What are Records and Fields?
- Different Types of SQL Commands

M1.W1.D1.3 Querying the Database - I (105 min)

- Framework of the Query
- The SELECT statement
- Column Aliases
- Distinct Function
- Sorting the Output Dataset (Order By)
- Filtering the Data
- Where Clause
- Wild Cards
- Adding commentary
- Export Dataset to Excel

M1.W1.D1.4 Hands-on Exercise (75 min)

Module 1: Week 1: Day 2 (M1.W1.D2) – 5 hrs

M1.W1.D2.1 Working with Tables (90 min)

- Introduction on Objects & Schemas
- What are the different types of SQL Server Data Types?
- How to Create Tables and what are the Constraints?
- Column Properties
- Indexing Columns
- Alter, Update, Insert, Delete, Drop, Truncate, Case Statements on Tables
- Adding, Altering, Deleting and Modifying Columns
- Exercise **(30 min)**

M1.W1.D2.2 Querying the Database – II (150 min)

- Handling Null Data
- Datatype Conversion
- Aggregate Functions
- Introducing the concept of Group by
- Having
- Introduction to Statistical Functions
- Calculated Columns
- Concatenation
- Aggregate function with Over, Partition by Clause

M1.W1.D2.3 Hands-on Exercise (60 min)

M1.W1.D2.4 Home Assignment (c.180 min)

A maximum of 120 min would need to be devoted to solving the assignment. Any outstanding query will be answered via email.

Module 1: Week 2: Day 3 (M1.W2.D3) – 5 hrs

M1.W2.D3.1 Revision Week 1 (30 min)

M1.W2.D3.2 Querying the Database III – JOINS (150 min)

- Concept of Venn Diagram
- Inner Join
- Outer Join
- Left Join
- Right Join
- Self Join
- Cross Join
- Exercise

M1.W2.D3.2 Querying the Database IV – SUBQUERIES (120 min)

- Concept of Nested/Sub-Queries
- Exercise

Module 1: Week 2: Day 4 (M1.W2.D4) – 4.5 hrs

M1.W2.D4.1 Querying the Database IV – SUBQUERIES (contd.) (60 min)

M1.W2.D4.2 Dealing with Dates (30)

M1.W2.D4.3 Exercise on all Concepts learnt in the Module (180 min)

M1.W2.D4.4 Final Assignment

An Assignment Covering all the above concepts shall be sent via email to all the participants of the Module - 1 within 2 working days of the completion of Module 1. The task must be completed and submitted within 2 weeks of the receipt of the assignment. A certificate of completion of the course will be awarded, irrespective. SQL Competence Level certificate and focus areas would be reported only on successful submission of the Final Assignment within stipulated time.

Course Content

Module 2: Advanced Level

Module 2 will be taught across two weeks, each week having 2 separate sessions (days) and each session lasting 4.5 hours.

Module 2: Week 1: Day 1 (M2.W1.D1) – 4.5 hrs

M2.W1.D1.1 Prep Work (30 min)

- Installing SQL Server Management Service
- Attaching Database for the Module

M2.W1.D1.2 Introduction to Database Normalisation (30 min)

- What is normalisation? Relational DB design
- Various normal forms: 1NF, 2NF,3NF
- Pros and cons of normalisation

M2.W1.D1.3 Ranking and Value Window Functions (60 min)

- Rank (), ROW_NUMBER (), DENSE_RANK (), PERCENT_RANK ()
- CUME DIST(), NTILE()
- Lag (), Lead (), First_value (), Last_value ()
- Handling Duplicates

M2.W1.D1.4 If Else Statement (45 min)

- Testing single and multiple conditions using IF/ELSE constructs

M2.W1.D1.5 Looping (45 min)

- While loop

M2.W1.D1.6 Hands-on Exercise (75 min)

Module 2: Week 1: Day 2 (M2.W1.D2) – 4.5 hrs

M2.W1.D2.1 Variables (45 min)

- Declaring variables
- Setting Values
- Operations with variables
- Scope of variables
- Global Variables

M2.W1.D2.2 Stored Procedures (60 min)

- Creating SP
- Altering SP
- Passing Parameters to a SP
- Introducing the concept of Group by
- Return Values

M2.W1.D2.3 Views (45 min)

- Concept; how views work
- Creating and altering views

M2.W1.D2.4 Hands-On Exercises (c.90 min)

M2.W1.D2.5 Home Assignment (c.180 min)

A maximum of 180 min would need to be devoted solving the assignment. Any outstanding query will be answered via email.

Module 2: Week 2: Day 3 (M2.W2.D3) – 5 hrs

M2.W2.D3.1 Revision Week 1 (30 min)

M2.W2.D3.2 Temp Tables (30 min)

- Use of Temp Tables
- Advantages and Disadvantages of Temp Tables
- Examples

M2.W2.D3.4 Merging (20 mins)

- Union, Union All
- Merge

M2.W2.D3.5 Manipulating Strings & Advanced Functions (60 min)

- Length (), Left (), Right ()
- Substring ()
- Trim ()
- Character Indexing
- Replace
- Coalesce
- Cast
- Convert
- Random Sampling using Rand Function

M2.W2.D3.3 Dynamic SQL (100 min)

M2.W2.D3.6 Hands-On Exercises (60 min)

Module 2: Week 2: Day 4 (M1.W2.D4) – 4.5 hrs

M2.W2.D4.1 CTE (60 min)

M2.W2.D4.2 Pivoting Data (45 min)

M2.W2.D4.3 Automating queries/SP with Jobs (45 mins)

M2.W2.D4.4 Using Import Export Wizard (30 mins)

M2.W2.D4.5 Revision of Module with Hand-On Exercises (90 mins)

M2.W2.D4.6 Final Assignment

An Assignment Covering all the above concepts shall be sent via email to all the participants of the Module - 2 within 2 working days of the completion of Module 2. The task must be completed and submitted within 2 weeks of the receipt of the assignment. A certificate of completion of the course will be awarded, irrespective. SQL Competence Level certificate and focus areas would be reported only on successful submission of the Final Assignment within stipulated time.