**THE MODULES – Day 16-17**

### Design Patterns and Principles

* Understanding SOLID Design Principles
* Understanding Design Patterns and its real use
* Difference between Design Principles and Patterns
* Types of Design Patterns (Creational, Behavioural, Structural)
* Knowing and Implementing Few Important Design Patterns (Singleton, Factory, Abstract Factory)
* Design Patterns implemented in .NET Framework

### Dependency Injection using Unity Framework

## Dependency Inversion Principle

## Inversion of Control

## Dependency Injection

## Creating a console application

## Adding Reference to Microsoft Unity Framework

## Adding BL class

## Adding DL class

## Adding Interface

## How to configure the Unity Container

## Running and debugging an application

## Final output

* Dependency Injection Pros and Cons.

**THE MODULES – Day 18**

### Unit Testing with TDD approach

## What is Unit Testing

## Advantages of Unit Testing

* Unit Testing C# Code using tools like Nunit

## MS Test Testing Framework

## Working with MS Test

## Microsoft Test Framework (Mock Framework)

* TDD Approach of Software Delivery
* Understanding SDLC Process Models (Waterfall Model, Agile Process Model)

**THE MODULES – Day 19**

### RDBMS Fundamentals Concepts

* Why RDBMS
* Architecture layers
* Different models (hierarchy, network, OO, relational)
* RDBMS concepts: tables, keys, relationships
* Data types
* Create tables, basic DDL

### Creating Tables and Data Types

* Table Architectures
* Designing Tables
* Working with SQL Table Scripts
* Column in Tables
* Exploring Data Types
  + Character Data Types
  + Numeric Data Types
  + Date/Time Data Types
  + TEXT/NTEXT Data Types
  + Other Data Types
* Calculated Columns

**THE MODULES – Day 20**

### Normalization Concepts

* Overview of SQL architecture (server, instance, DB, tables, temp DB)
* ER model concepts: entities, attributes, relationships, cardinality
* ER model notations, examples
* ER diagram assignment
* Mapping relationships
* Redundancy and normalization
* Normalization forms
* Dependency diagrams
* Translation to physical model

### SQL Server Overview

* What is SQL Server
* Advantages of SQL Server 2016/19
* SQL Server architecture
* SQL Server security Model
* SQL Server System databases(Master,Temp,MSDB,Model)

**THE MODULES – Day 21**

### SQL Server Tools

* Server Tools
  + SQL Server manager
  + SQL Server Agent
  + Server Network Utility
* Client Tools
  + SQL Enterprise Manager
  + SQL Query Analyzer
  + Client Network Utility

### SQL Profiler

### Creating Databases

* Rules of Normalization
* Physical and logical database design
* Database File Concepts
* Configuring File Growth
* Using Multiple Files
* Using Filegroups

### Enforce Data integrity

* Types of data Integrity
  + Entity Integrity
  + Domain Integrity
  + Referential Integrity
  + User-Defined Integrity
* Creating Keys
  + Primary Key Considerations
  + Creating Primary Keys
  + Creating foreign Keys
* Creating User Data Columns
  + Column Constraints

**THE MODULES – Day 22**

### Partitions and Rank Function

### Retrieving and Modifying Data

* Select Data From a single Table
* Select Data from Multiple tables
* Select Options
  + TOP N
  + DISTINCT
  + BITWISE
  + CASE
* Working with Nulls
  + Testing for Nulls
  + Handling Nulls
* Scalar Functions
  + Summing and Grouping Data
  + Aggregate Functions
  + Using the CUMPUTE and COMPUTE BY Clause
  + Generating Totals
* Inserting Data
* Updating Data
* Deleting Data
* Potential Data Modification Obstacles

**THE MODULES – Day 23**

### JOINS

* Using Joins
  + Inner Joins
  + Outer Joins
  + Self Joins
  + Cross Joins
* Using Sub Queries
  + Simple Sub Queries
  + Correlated Sub queries
* Common Table Expression
  + What is CTE
  + When to use CTE
  + Advantages of CTE
  + CTE in Action
  + Multiple CTE in one query
* Using Unions
  + Intersection Unions
  + Difference Unions
* Tuning queries
  + Execution Plan Analysis
  + Using SET Commands
  + UNION Vs UNION ALL
  + IN Vs. EXISTS Vs. JOIN
  + NOT IN Vs. NOT EXISTS Vs. LEFT JOIN
  + BETWEEN
* GROUP BY AND OREDRBY Clauses

**THE MODULES – Day 24**

### T-SQL PROGRAMMING

### Variable Declarations

* Programming Constructs
* Conditional statements
* If-else
* Case
* While
* Break
* Continue

### IMPLEMENTING FUNCTIONS

* Creating Functions
* Implement Scalar Functions
* Create Table Valued Functions

### IMPLEMENTING STORED PROCEDURES

* What is Stored Procedure
* Creating Stored Procedures
* Executing Stored Procedures
* Creating Parameterized Stored Procedures
* Handle errors in a stored procedure

**THE MODULES – Day 25**

### IMPLEMENTING TRIGGERS

* What is Trigger in SQL Server
* Why and when to use a trigger
* Types of Triggers (DDL and DML Triggers)
* Creating and Applying After Trigger and Instead of Trigger

### IMPLEMENTING INDEXES

* What is Index
* Advantages of Index
* Types of Indexes (Clustered, Non-clustered, Unique, Filtered Indexes)
* Create, Delete and Modify Indexes

**THE MODULES – Day 26**

### IMPLEMENTING CURSORS

* What is Cursor
* Types of Cursors (Implicit and Explicit Cursor)
* Creating Cursors and Fetching Data from it

### Transaction in SQL SERVER

* What is Transaction
* Properties of Transaction
* Transaction Control
* Isolation Level in Transaction