LTI
Let's Solve

Celebrating 20 Years

.NET Course Content

A Larsen & Toubro Group Company

Objectives of this Course:

- To understand the Web applications that are Scalable, Maintainable.
- To understand the Architecture and Design of Web applications.
- To understand how to separate the application concerns based on functionality.
- To understand effective and clean division between Controllers, Models and View using ASP.NET MVC.
- To understand the Modern Development techniques using Frameworks like jQuery and Angular.

Prerequisites:

- Knowledge of Basic Programming Techniques, Basic Database Functionalities and Basic SDLC.

Course Outline

Boot Camp Phase – I

Day 1 – 5:
DBMS Concepts and MS SQL Server

- Introduction to Databases
- Database Models.
  - Relational Model
- Data Design and Normalization
- Structured Query Language and its categories
  - DDL – DML – DQL – DCL – TCL
- Selecting Data from Columns
  - All columns
  - Some columns
  - Derived columns
  - Using DISTINCT
  - Naming result columns
  - WHERE and comparison operators
  - Nulls
- Selecting using Operators
  - Arithmetic Operators
  - Relational Operators
  - Logical Operators
  - Other Operators
- Selecting using Functions
  - Number Functions
  - Character Functions
  - Date and Time Functions
  - Aggregate Functions
  - Other Functions
- ORDER BY
  - ASC
  - DESC
  - Multiple columns
  - Expressions
  - Columns not in SELECT list
- GROUP BY
  - Single column
  - Multiple columns
  - HAVING considerations
  - With ORDER BY
- JOINS
  - INNER
  - OUTER (LEFT, RIGHT & FULL)
  - ON vs. WHERE
  - Cartesian product

- Implementing Data Integrity by using Constraints
  - Data Integrity Overview
  - Creating Constraints
  - Implementing Constraints
  - Not Null
  - Unique Key
  - Primary key
  - Check Constraints
  - Default
  - Foreign Key
  - Disabling Constraints
- Transaction Management
  - What is Transaction
  - Commit
  - Rollback
- Implementing Views
  - Introduction to Views
  - Creating and Managing Views
- T-SQL Programming
  - Variable Declarations
  - Programming Constructs
  - Conditional statements
  - If-else
  - Case
  - While
  - Break
  - Continue
- Implementing Stored Procedures
  - What is Stored Procedure
  - Creating Stored Procedures
  - Executing Stored Procedures
  - Creating Parameterized Stored Procedures
  - Handle errors in a stored procedure
- Implementing Functions
  - Creating Functions
  - Implement Scalar Functions
  - Create Table Valued Functions
- Implementing Triggers
  - INSERT triggers
  - DELETE triggers
  - UPDATE triggers

Day 6 – 15:
C# Programming with ADO.NET

.Net Framework

- Introduction t.Net Framework
- Compilation Process
- CLR
- CLS
- CTS
- Framework Library
- Different .Net Framework Version
- Assembly
- Overview of New Features of .Net 4.5

C# Types

- Value and Ref Types
- Struct
- String Manipulation
- Enum
- Arrays
- Boxing and Unboxing
- Type Conversion
- Scope

C# Flow Control

- Branching
- Switching
- Looping
- Using Foreach
- Jumping

C# Methods

- Method Overview
- Passing Parameter
    - IN
    - OUT
    - REF
- Param array

Object Oriented Programming

- Classes and Objects
- namespaces
- Constructor
- Properties and indexers
- Inheritance
- Access Modifiers
- Virtual members

- Abstract classes
- Static
- Read-only and const fields
- Interfaces

Exception Handling

- Built in Exceptions
- Handling Exceptions
- Custom Exception classes
- Throwing exceptions
- Properties in Exception class

Introduction to Delegates

Generics

- Need of Generics
- Generic Classes
- Generic Methods
- Generic Constraints

Collections

- Non-generic Collections
- Generic Collections
    - List
    - Stack
    - Queue
        - Dictionary
        - SortedList
- Benefits of Generic Collections

LINQ

- Introduction to Language Integrated Query
- Query syntax
- Query a collection of objects

ADO.NET

- Overview of ADO.NET
- History of ADO.NET
- ADO.NET Architecture
- SqlDataReader
- Performing CRUD Operations using Connected
- DataSet
- Performing CRUD Operations using Disconnected
- Local and Distributed Transactions
- SqlTransaction Class and its methods
- TransactionScope class

C# Programming & ADO.NET – Mini Project I

Assessment (Boot Camp - Phase I)

Interviews by internal SMEs

Day 16 - 23:
C# Codility

Introduction to Data Structures & Algorithms

- Understanding Computational Thinking
- Understanding Space and Time Complexity
- Understanding Big-O notation
- Algorithm Run Time Analysis

Coding Problems and Challenges:

- Iterations & Arrays
  - Iteration techniques for arrays and collections
  - Solving coding challenges on Arrays
- Time Complexity
  - Revisiting Big-O notations
  - Writing efficient algorithms to improve performance
- Counting Elements
  - Understanding counting of elements algorithm
  - Using this technique for solving various problems
- Prefix Sums
  - Understanding prefix sum algorithm
  - Understanding suffix sum algorithm
  - Using these techniques for solving various problems
- Sorting
  - Revisiting Sorting algorithms
  - .NET support for sorting
  - Solving problems which involves sorting of data
- Stacks and Queues
  - Understanding data structures like Stacks and Queues
  - Difference between LIFO and FIFO
  - Using these techniques for solving various problems
- Introduction to Greedy and Dynamic Programming techniques

C# Codility Test

Boot Camp Phase – II

Web Technologies

Day 24 - 26:

Web Technologies - Web Concepts
- Introduction to the Internet and the World Wide Web
- Understanding the concept of Protocols
- Why Web Standards?

Web Technologies – HTML
- Overview of Hypertext Mark-up Language (HTML) and Cascading Style Sheet (CSS)
- Understanding & using HTML

Web Technologies - HTML 5
- HTML5 Intro
- HTML5 New Elements

Web Technologies – Cascading Style Sheet (CSS)
- Introduction to CSS
- Understanding & using CSS
- CSS Syntax

Web Technologies - CSS 3
- CSS3 Introduction
- New features of CSS 3
- Exploring commonly used CSS 3 properties

Web Technologies – JavaScript
- What is JavaScript?
- JavaScript Events and Functions
- JavaScript Form Validation

Web Technologies – jQuery
- Introduction To jQuery
- Selection and DOM Traversal
- Working with JavaScript Events

Day 27 - 33:

Advanced Web Technologies – Angular 8
- Angular - Introduction
- Understanding Single Page Applications (SPA)
- AngularJS 1.x vs Angular recent versions
- Introduction to TypeScript
    - Role of typescript in Angular

- Developing a simple Angular application
- Writing custom components
- Understanding One-way data binding
- Understanding Two-way data binding
- Angular forms and it's types
- Form validation
- Introduction to Angular Routing and DI (Dependency Injection)

Assessment (Boot Camp - Phase II)
Angular Codility Test
Web Technologies – Mini Project II

Specialization Phase

Day 34 - 37:
DevOps Basics

- What is Devops
- SDLC models,Lean,ITIL,Agile
- Why Devops?
- History of Devops
- Devops Stakeholders
- Devops Goals
- Important terminology
- Devops perspective
- Devops and Agile
- Devops Tools
- Configuration management
- Continuous Integration and Deployment

GIT: Version Control

- Introduction to Git
- About Version Control System and Types
- Difference between CVCS and DVCS
- A short history of GIT
- GIT Basics
- GIT Command Line
- Installing Git
- Git Essentials
- Creating repository
- Cloning, check-in and committing
- Fetch pull and remote
- Branching
- Creating the Branches, switching the branches, merging the branches.

Jenkins – Continuous Integration / Continuous Delivery/Deployment (CI/CD)

- Understanding CI/CD
- Introduction about Jenkins

- Build Cycle
- Jenkins Architecture
- Installation
  - Installing and configuring Jenkins
- Exploring Jenkins Dashboard
- Jobs
  - Creating Jobs
  - Running the Jobs
  - Setting up the global environments for Jobs
- Adding and updating Plugins
- Disabling and deleting jobs

Azure DevOps

- Account Creation
- Azure Repos
- Azure Pipelines
- Azure Artifacts
- Azure Test Plans
- Azure Boards
- Continuous Integration using Azure Pipelines
- Pipeline creation
- Environments
- Tasks
- Workflows
- Code Coverage
- Code Quality

Day 38 - 48:
ASP .NET MVC

Overview of ASP.NET

Introduction to MVC

- Introduction to different Web Technology
- What is ASP.NET MVC
- Role of Model, View, and Controller
- How ASP.NET MVC Works
- Key Benefits of ASP.NET MVC
- Understanding the structure of an ASP.NET MVC project

ASP.NET MVC Architecture

- The MVC Pattern
- MVC Page Life Cycle
- Controllers, Models, and Views
- URL Routing
- Controller Actions
- Razor View Engine

- Extensibility

URL Routing

- Introducing URL Patterns
- Creating and Registering a Simple Route
- Defining Default Values
- Using Static URL Segments
- Defining Custom Segment Variables
- Constraining Routes
- Using Attribute Routing
- Generating Outgoing URLs in Views

Razor View Engine

- Razor Basics
- Razor design goals
- Implementation of Razor view
- Razor syntax
- Using Razor Expressions
- Accessing Model Data in Razor views

Views

- View Engines
- Templates and Scaffolding
- ViewData and ViewBag
- Strongly-Typed Views
- Layout Pages
- Custom Sections
- Partial Views
- Child Actions
- Using a ViewModel Object
- Bundling & Minification

HTML Helpers

- Basic Helpers
- Strongly-Typed Helpers
- Creating Custom Helpers
- Declarative Helper

Controllers and Actions

- IController, ControllerBase, and Controller
- Defining Actions
- Action Selectors, Action Filters
- HTTP Verbs
- HttpContext and RouteData
- Returning Data with ActionResult
- Parameters and the Model Binder

Entity Framework

- What is Entity Framework
- EF Architecture
- Creating Entity Data Model
- Model Browser
- DB Context
- Eager and Lazy Loading
- Types of Entity
- Entity Lifecycle

Model Binding

- Object Relational Mapping (ORM)
- Entity Framework (EF) Database-first approach
- Entity Framework (EF) Code-first approach
- Entity Framework (EF) Model-first approach
- Model Binders
- Creating Unit Testable Applications in ASP.NET MVC

Model Validation

- Data Annotations
- Validation HTML Helpers
- Model State
- Client-Side Validation

Security in MVC

- Authentication and Authorization
- ASP.NET Identity
- Configuring Forms Authentication
- MVC 5 App with Facebook, and Google OAuth2 Sign-on
- Enable role-based security
- Authorize attribute

Filters

- Introducing the Filter Types
- Using Authorization Filters
- Using Authentication Filters
- Using Exception Filters
- Using Action Filters
- Using Result Filters
- Using Other Filter Features

ASP.NET Web API

Introduction

- ASP.NET Web API
- Representational State Transfer
- REST and Web API

- HTTP Services Using Web API
- Using Fiddler
- Web API vs. WCF

Web API and HTTP

- HTTP Response Codes
- HttpResponseException
- Implementing POST
- Implementing PUT
- Implementing DELETE

Media Formatters and Content Negotiation

- Internet Media Types
- Media Formatters
- JSON and XML Formatters
- Content Negotiation
- Accept and Content-Type Headers
- Using the Query String
- Custom Request Headers
- Serialization
- BSON Serialization

Binding, Validation, and Routing

- Reading Raw HTTP Requests
- Route Data, Query String and Request Body
- Binding to Simple Types
- Binding to Complex Types
- Validation Using Data Annotations
- Routing in ASP.NET Web API
- Using Default Routes

.NET Client

- Web API Client Libraries
- HttpClient
- Issuing GET Requests
- Issuing POST Requests
- Other Requests

Integration of Angular with Web API

Assessment (Specialization)

Day 49-57:

Introduction to Agile (Scrum)

Project Gladiator

Project Evaluation by SMEs