

.NET Course Content



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 – 14:

C# Programming with ADO.NET

.Net Framework

- Introduction to .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

Boot Camp Phase – II

Day 15 - 20:

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

Web Technologies

Day 21 - 22:

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 23 - 28:

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 29 - 32:

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 33 - 42:

ASP .NET MVC

Introduction

- 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
- HttpResponseMessage
- 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

Introduction to Agile (Scrum)

Assessment (Specialization)

Day 43 - 49:

Project Gladiator

Project Evaluation by SMEs