**.NET Core and C# 8**

**Course Outline is created on considering 4 hr. daily session (21 Working days)**

**Day-1**

* Introduction to .NET Core
  + .NET Core – Overview
  + Characteristics of .NET Core
  + The .NET Core Platform
  + .NET CORE architecture and Advantages
  + Build and run Cross platform apps
  + .NET Core – Environment Setup
  + .NET Core – Code Execution
  + Middleware
  + .NET Core – Modularity
  + .NET Core – Project Files
  + IIS Publishing & different cross platform deployments
  + Microservices using .NET Core
  + .NET Core – Windows Runtime and Extension SDKs.
  + .NET Core – Create .NET Standard Library.
  + What is .NET Framework
  + Comparison between .NET Framework & .NET Core
* Introduction to C#
  + Features of C#
  + C# Compilation and Execution
  + General Structure of a C# Program
* Data Types and Arrays in C#
  + Data Types in C#
  + Value Types and Reference Types
  + Boxing and Unboxing
  + Single Dimensional, Multi-Dimensional & Jagged arrays
  + Nullable Types
  + Implicitly Typed Local variables

**Day-2**

* + Var vs dynamic
  + Is and as operator
  + Ref vs out keywords
  + The ‘object’ base class in .net
  + Equals () vs ==
  + String vs StringBuilder
  + Various String class methods
  + Default parameters, named parameters
  + Parse () vs TryParse() vs Convert Class methods

**Day-3**

* Debugging in C#
  + Various Types of .NET Projects
  + Tracing, Debugging, Build
  + Compile Options
  + Using break points
  + Using break conditions
  + Using watch and output window
  + Creating multiple projects within one solution
  + Customizing Visual Studio Settings – Extensions, NuGet Package, Environmental Settings
* OOP with C#
  + Structures and Enums
  + The architecture of a class in C#

**Day-4**

* + Instance, Class & Reference variables
  + Access Modifier
  + Abstract Classes
  + Constructors, Destructors, The GC
  + .NET Base class library
  + Inheritance in C#
  + Method Overloading
  + Method Overriding
  + Operator Overloading
  + Method Hiding
  + Access modifiers: private, pubic, protected, internal, protected internal, new

**Day-5**

* + Anonymous types
  + Abstract classes
  + Sealed classes
  + Creating Interfaces
  + Implementing Interface inheritance
  + Declaring properties within Interfaces
  + Namespaces
  + Creating and using Generic classes
  + Indexers & Properties
  + Auto Implemented properties
  + Static Classes
  + Property Accessors
  + Partial types
  + Extension methods
  + Object Initializer

**Day-6**

* Evaluating Regular Expressions in C#
  + RegEx Class
  + Forming Regular Expression
  + Methods for Regular Expression
* Exception Handling
  + Exceptions in C#
  + Exception class hierarchy
  + Try block
  + Multiple catch blocks
  + Finally block
  + Purpose of throw keyword
  + Purpose of inner exception
  + Creating Custom Exception

**Day-7**

* Garbage Collection in C#
  + Role of a Garbage Collector
  + Garbage Collection Algorithm
  + Finalize vs Dispose
* Collections & Generics
  + System.Collections Namespace
  + Collection Interfaces
  + Collection Classes
  + The collection API
  + Working with Generics
  + Creating Generic class, Generic Methods, Interfaces, Delegates
  + Collection Initializers
  + Iterators
  + Constraints

**Day-8**

* Anonymous Types, Delegates, Events & Lambda
  + Extension Methods
  + Anonymous Type
  + Var and Dynamic
  + Introduction to Delegates
  + Events in C#
  + Anonymous Methods
  + Lambda Expression
  + Expression Tree

**Day-9**

* File I/O and Serialization
  + Using StreamReader, StreamWritter
  + Using BinaryReader, BinaryWriter
  + Using File, FileInfo, Directory, DirectoryInfo
  + Serialization modes: Binary, SOAP, XML
  + JSON serialization

**JavaScript**

**Day-10**

* Introduction
  + JavaScript Introduction
* Language Syntax
  + Variable declaration
  + Operators
  + Control Statements
  + Error Handling
  + Understanding arrays
  + Function Declaration
* Built In Functions
  + Built In Functions
  + Standard Date and Time Functions

**Day-11**

* HTML Forms
  + HTML Document object Model
  + Working with HTML form and its elements
* HTML DOM
  + HTML Document object Model
  + Working with HTML form and its elements
  + Other Document Object Model
* Cookies
  + create cookies?
  + Working with cookies

**Day-12**

* Working with Objects and Classes
  + Working with Objects
  + Call method in JavaScript
  + Inheritance in JavaScript using prototype

**RDBMS & SQL Server**

**Day-13**

* Introduction to RDBMS
  + Introduction to databases
  + Data Models in Database
  + Properties of RDBMS
* Normalization
  + Working with Data Types, Tables & Data Integrity covering DDL, DML, DCL statements
  + Working with Data Types (Only Basics of Data Types)
  + Working with Schema
  + Working with Tables
* Beginning with Transact-SQL
  + Transact-SQL
  + System Functions
  + Advanced T-SQL Queries`
  + Advanced T-SQL Statements
  + Other T-SQL Statements
  + Set Operators
  + Transact-SQL
  + System Functions
  + Advanced T-SQL Queries
  + Advanced T-SQL Statements

**Day-14**

* Working with Joins and Subqueries
  + What are Joins?
  + Types of joins
  + Subqueries
* Database Objects: Indexes and Views
  + Introduction to Index in SQL Server
  + Introduction to Views in SQL Server
* Stored Procedures
  + Stored Procedure
  + Implementing Stored Procedure
* Exception handling using TRY-CATCH

**.NET MVC**

**Day -15**

* Fundamental
  + ASP.NET Core - Project.Json
  + ASP.NET Core – Configuration
  + MVC Design Pattern
* Middleware
* Exceptions
* Static Files
* Setup MVC
  + Routing
  + Attribute Routes
  + Action Results
  + Model
  + Views
  + User Registration
  + Create a User
  + Log In and Log Out

**Day- 16**

* Exploring Controllers
  + Working with Controllers
  + Routing
  + Attribute Routing
  + Action Methods
  + Action Filters, Types of Action Filters
  + Passing Data from controller to view
* Working with Views
  + ASP.NET MVC Razor View Engines
  + HTML Helpers
  + Working with Layout
* Exploring Models & working with data
  + Model Binding
  + Data Annotation
* Validation
* Using AJAX In ASP.NET MVC
  + Introduction to Ajax
  + AJAX in ASP.NET MVC
  + AJAX Helpers
  + Partial Page rendering

# ASP.NET Core Web API

#### Table of contents

#### Day-17

* Introduction to .Net Core WebAPI
  + Introduction to Web Service
  + Introduction to REST API
  + Introduction to Web API
  + Difference between Web Service, WCF Service and Web API
  + HTTPS Verbs
  + Web API Routing
  + Configuring WebApi
  + Testing the Web API Project with Postman and Swagger
  + Building First ASP.NET Core Web API
  + Fluent Validation

**Day-18**

* Working with Relational Data using Entity Framework Core
  + Relationships in EF Core
  + HTTP Response Status Codes
  + Try-Catch-Finally block
  + Throwing custom exceptions
  + Global error handling
  + Custom global error handling
  + DML Manipulation using Repository Pattern
* Controller Action Return Types
  + Introduction to Controller Action Return Types
  + Specific Type
  + IActionResult
  + ActionResult<Type>
  + Custom Return Type
* Web API Versioning
* Web API Logging
* Unit Testing in Web API

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# LINQ and Entity Framework Core

**Day-19**

* Language Integrated Query

#### Table of contents

* + Introduction, LINQ Syntax
  + Query Operators
  + Select, from, Where
  + ofType
  + OrderBy
  + ThenBy
  + GroupBy, into
  + Select
  + SelectMany
  + Take, TakeWhile
  + First
  + FirstOrDefault
  + Single
  + SingleOrDefault
  + Aggregate functions Sum, Min, Max, Average, Count
  + Distinct
  + Intersect
  + Except
  + Join

**Day-20**

* Entity Framework Core
  + Overview of ORM Products
  + Entity Framework introduction
  + Using Database first Approach
  + Using Code First approach
  + Implementing Repository Pattern
    - Introduction & Benefits
    - Repository Pattern implementation
    - Setting up Entities in EFCore
  + Using LINQ to Entities to perform CRUD operations

**Day-21**

* + Case Study Discussion and mentoring
  + Demonstration how to use all the above technologies in a real project