**C#.NET Programming**

**Course Overview**

The **C#.NET Programming** course introduces learners to C#, a versatile, modern, object-oriented programming language developed by Microsoft, designed to build applications on the .NET platform. C# is widely used for developing desktop applications, web applications, cloud services, mobile apps, and games.

This course covers core programming concepts, object-oriented design, advanced language features, and working within the .NET ecosystem. It is ideal for beginners as well as developers seeking to leverage C# for building scalable and maintainable software solutions.

**Course Objectives**

By the end of this course, learners will be able to:

* Understand the syntax and structure of C# programming language.
* Apply object-oriented programming principles including classes, inheritance, and polymorphism.
* Handle exceptions, work with collections, and manipulate data.
* Build Windows desktop applications and console programs.
* Develop web applications using ASP.NET with C#.
* Access and manipulate databases with ADO.NET and Entity Framework.
* Explore asynchronous programming and advanced language features.

**Syllabus Breakdown**

**Module 1: Introduction to C# and .NET Framework**

* Overview of C# language and .NET platform
* Setting up Visual Studio and writing the first program
* Data types, variables, and operators
* Control flow: conditionals and loops
* Debugging and error handling basics

**Module 2: Object-Oriented Programming in C#**

* Classes and objects
* Fields, properties, and methods
* Constructors and destructors
* Encapsulation and access modifiers
* Inheritance and polymorphism
* Abstract classes and interfaces

**Module 3: Advanced C# Concepts**

* Delegates and events
* Lambda expressions and anonymous methods
* Generics and collections (List, Dictionary, etc.)
* LINQ (Language Integrated Query)
* Exception handling and custom exceptions

**Module 4: Working with Data and Files**

* File input/output operations
* Serialization and deserialization (JSON, XML)
* Working with streams and buffers

**Module 5: Windows Forms and Desktop Application Development**

* Introduction to Windows Forms
* Designing UI with controls and components
* Event-driven programming
* Dialogs, menus, and user input handling

**Module 6: Database Connectivity**

* Introduction to ADO.NET
* Connecting to SQL databases
* Executing queries and stored procedures
* Using DataSets and DataAdapters
* Introduction to Entity Framework ORM

**Module 7: ASP.NET Development with C#**

* Basics of web development with ASP.NET
* Creating web forms and MVC applications
* Using Razor syntax and views
* Web API development basics

**Module 8: Asynchronous Programming and Advanced Features**

* Understanding async and await
* Multithreading basics
* Task Parallel Library (TPL)
* Introduction to .NET Core and cross-platform development

**Career Opportunities**

C# developers are in high demand across multiple domains including web development, enterprise software, gaming, and cloud computing. After completing this course, learners can pursue roles such as:

* **C# Developer**
* **.NET Developer**
* **Backend Developer**
* **Windows Application Developer**
* **Web Developer (ASP.NET)**
* **Game Developer (using Unity)**
* **Cloud Application Developer**

Organizations in **IT services, finance, gaming, healthcare, and cloud solutions** often seek skilled C# programmers for diverse software development projects.