Program Structure

Courses	Day	Date (Time - 8:45 AM - 5:45 PM)	Modules	SubTopics
Introduction to .Net & C# & OOPS using C# & Data Handling using C#	Day 1	18 July 2025	Introduction & Basic Programming Concepts	
			Getting started with .NET platform	Installation of Visual Studio 2019
				Introduction to .NET framework
				.NET framework architecture
				Common type system
				Common language specification
				Common language runtime
				Base class library
			Types in C#	Introduction to Classes
				Reading and Writing in the console
				Assembly
				Private
				Shared
				Types
				Value type and Reference type
				Boxing and Unboxing
				Strings
				String Builder
				Difference between String and StringBuilder
				Nullable types
	Day 2	19 July 2025	Core C# Programming	
			Arrays in C#	Array
				Single array
				Multi-dimension
				Jagged array
			Looping Construct	Loops and Statement
				IF statement
				For loop
				Foreach loop
				Switch statement
				While loop
				Do-while loop
	Day 3	21 July 2025	Getting Started with properties and functions	
			Access modifiers in C#	Access modifiers
				Private
				Public
				Protected
				Internal
				Protected internal
			Methods in C#	Methods

				Void method
				With parameter
				Return type method
				Static method
				Instance method
				Namespaces
				Unit testing
	Day 4	22 July 2025	Getting started with Inheritance for code reusability	
			Inheritance in C#.NET	Object Oriented Concept
				Inheritance
				Single
				Multilevel
				Multiple (using Interface)
				Hierarchical
				Hybrid
			OOPs principles ie Polymorphism in Action	
			Polymorphism in C#.NET	Polymorphism
				Method override
				Method overload
				Encapsulation
				Abstraction
			Object types in C#.NET	Properties
				Static
				Static class
				Static method
				Static constructor
			User define types in C#.NET	Structs
				Interface
				Abstract
				Enumeration
				Difference between Interface and Abstract
				Problem with multiple class inheritance
				Solution for multiple class inheritance using interface.
				Exception handling
	Day 5	23 July 2025	File Handling in C#.NET	
			File Handling in C#.NET	File I/O
				Create
				Write
				Append
				Delete
				Copy
			Collections in C#.NET: Generic and Non Generic	Collections
				Non generic
				Array list
				Hash table
				Sorted list
				Stack
				Queue

				Generic
				List
				Dictionary
				Sorted list
				Stack
				Queue
Advanced C# & introduction to .Net	Day 6	24 July 2025	Advance topics	
			Exception Handling in C#	Introduction to Exception Handling Types of Exceptions in C#, The try, catch, finally Blocks Common Exception Classes Creating Custom Exceptions Exception Filters (C# 6.0 and Later) Exception Handling Best Practices
			Latest C# 7.0 features	Extension Methods
				Tuples and Deconstruction, Pattern Matching, Local Functions,Out Variables, Ref Locals and Returns, Discards (_) & Expression-bodied Members
			C# 8.0 features	Nullable Reference Types, Async Streams, Ranges and Indices,Switch Expressions, Default Interface Methods, Pattern Matching Enhancements, Using Declarations & Readonly Members
			Searching and Sorting Data Structure	Importance of searching in data structures
				Types of searching algorithms (Linear vs Binary)
				Types of sorting algorithms (Comparison-based vs Non-comparison-based)
				Bubble Sort, Selection Sort , Insertion Sort
				Efficiency comparison among Bubble, Selection, and Insertion Sort Real-world scenarios for each sorting algorithm
			Indexers and Attributes in C#	Indexer
				Difference between index and properties
				Attributes
	Day 7	25 July 2025	Delegates & Reflection	
			Delegates in C#.NET	Delegates
				Single cast
				Multi cast
			Standard C# Features	Anonymous method
				Lambda expression

				Func
				Action
				Predicate
				Events
				INtroduction to Reflection and its practical use
				Generics
				Generic class
				Generic field
				Generic method
				Advantage of generics
				Threading
				Ref and Out keyword
				Async & Await
	Day 8	26 July 2025	**Milestone Assessment 1 (C# Fundamentals)**	
	Day 9	28 July 2025	Unit Testing & Test-Driven Development	
			Introduction to Unit Testing	What is unit testing?
				Benefits of unit testing
				Basic concepts and terminology
				Testing Frameworks
			Introduction to Testing Frameworks	Introduction to popular testing frameworks (NUnit, MSTest, XTest)
				Setting up a testing framework in a project
				Understanding test projects and test classes
			Writing Test Cases	Anatomy of a unit test
				Creating test methods
				Organizing test classes and test suites
			Assertions and Test Data	Using assertions to validate test results
				Common assertion methods (e.g., Assert.AreEqual, Assert.IsTrue)
				Test data setup and teardown
			Testing Techniques	Test-driven development (TDD)
				Testing different scenarios (positive, negative, edge cases)
				Mocking dependencies using frameworks like Moq
			Test Execution and Reporting	Running tests using the testing framework
				Analyzing test results and understanding test reports
				Handling failures and debugging failing tests
	Day 10	29 July 2025	.NET Core	
			Introduction to .NET Core	DOT NET CORE
				What is .NET Core
				Benefits of .NET core
				What is new in .NET Core

				.NET Core vs .NET Framework
				First .NET Core Application.
				Building .NET Core Applications
			Middleware and Static Files	Understanding middleware in ASP.NET Core
				Configuring and using middleware components
				Serving static files (HTML, CSS, JavaScript)
				Security considerations with static files
			Introduction to Razor Pages	Overview of Razor Pages architecture
				Advantages of Razor Pages over traditional MVC
				Creating and configuring Razor Pages in a project
				Folder structure and naming conventions
			Razor Syntax and Page Model	Razor syntax basics and directives
				Mixing HTML and server-side code
				Understanding the PageModel class
				Property binding and handling requests
			.NET Security & Reliability	
			.NET Security & Reliability	Understanding security in .NET applications
				Common security practices (authentication, authorization, encryption)
				Secure coding practices
				Using .NET libraries for encryption, secure communication, and secure storage
				Building Reliable Applications
				Designing for reliability
				Exception handling strategies
				Error Handling & Logging
				Implementing error handling best practices
				Logging errors and monitoring application health
Advanced C# & introduction to .Net	Day 11	30 July 2025	SOLID Principles & Design Patterns	
			SOLID Principles	Introduction to SOLID Principles
				Overview of SOLID principles (SRP, OCP, LSP, ISP, DIP)
				Practical Application of SOLID
				Refactoring code to adhere to SOLID principles
			Design Patterns	Introduction to Design Patterns

				Understanding the importance of design patterns in software design
				Overview of common design patterns (Creational, Structural, Behavioral)
SQl & microsoft SQl server			Introduction, Basic Concepts, and DML Commands	
			Introduction to Databases	Installation of SQL Server Management Studio
				Introduction to basic database concepts.
				Advantage of DBMS
			Keys, Operators & DML Commands	Introduction to RDBMS
				Creating Tables
				Relationship between tables.
				Primary keys, Foreign keys, Unique keys
				SQL operators (Arithmetic, Comparison, Logical)
				DML Commands
				CRUD operations
	Day 12	31 July 2025	DDL, DCL, and TCL Commands	
			SQL Fundamentals	SQL commands
				Constraints
				Primary key
				Foreign key
				Types of contraints - Not null, Check, Unique.
				DDL Commands
				DCL & TCL Commands
				Grant & Revoke, Commit & Rollback
	Day 13	01 August 2025	Advanced Queries, Functions, and Joins	
			Function in SQL Server	Functions
				Built-in Functions
				Scalar functions (e.g., LEN, ROUND, GETDATE)
				Aggregate functions (e.g., SUM, AVG, COUNT)
				User-defined Functions
			Working with Queries	Aggregate functions
				Joins
				Inner join
				Left join
				Right join
				Self-join
				Full outer join
				Cross join
				Set operators
				Union
				Intersect
				Minus
				Stored procedure

			Stored Procedures and Triggers	Input and Output parameter
				If Else
				Transaction
				Error Handling
				Functions
				Scalar function
				Table value function
				Single table value
				Multi table statement
				Difference between SP and function.
				Call functions in SP.
	Day 14	02 August 2025	Views and Normalization	
			Working with Views & Indexing	Views
				Indexing
				Clustered index
				Non-clustered index
				Unique index
			Normalizations	Normalizations
				First normal form
				Second normal form
				Third normal form
				Benefits of normalization and when to apply it
	Day 15	04 August 2025	Mongo DB	Introduction to NoSQL
				Introduction to MongoDB
				MongoDB CRUD Operations
				MongoDB Data Modeling,Indexing and Query Optimization
				Introduction to MongoDB Atlas
				Aggregation Framework in MongoDB
HTML CSS JS			HTML /CSS /JavaScript	
	Day 16	05 August 2025	HTML and CSS	Basic Structure of an HTML Page
				Various Tags and Attributes
				Inline and Block Elements
				Forms
				Semantic elements
				HTML 5 Features
				Paper based Layout
				Hero unit
				Audio Video Players
				Semantic Markup
				Geo Location
				Intro to CSS
				CSS Properties and their syntaxes
				Various Selectors in CSS and their preference orders
				Inline , Internal and External Styling
				Box Model

				CSS 3
				Advance Unites like rem, em and vh vw
				New elements added like Round Corners
				Working with flex box
			Bootstrap Basics of JavaScript	Working with Bootstrap
				Cards, Tables, and Lists
				Develop a static webpage,Forms and Form Validations
				Navs and Navbar,Pagination and Progress
				Navigation and Pagination
				Basics of JavaScript - Data type, variables,
				Type Conversions, Basic Operators,
				Branching and Looping Statements, Functions, Arrays and Strings
			Advanced Java Script	Date and Time Objects, Closures, DOM Objects, ES6+ Features, Promises and Async Programming, Closures and Scoping,
				Functional Programming, Error Handlingclient side scripting,
				JSON, JSON - Objects, arrays etc, JSON-Ajax Advanced DOM Manipulation,
				jQuery Plugins, Event Delegation, Ajax and Deferred Objects, Optimization and Performance
Getting started With FrontEnd (Angular)	Day 17	06 August 2025	SPA & Working with NPM	
			Type Script JSX	Var-hoisting Functional Score Classes & Methods & Constructor
				Maps Iterators Interfaces Declartions and Annotations
				Anytype Enumeration Decorator , Arrays & tuples
	Day 18	07 August 2025	Working with NPM & Node JS	Introuction to NPM
				Initializing a project with npm init.
				Installing, updating, and removing packages:
				npm install, npm update, npm uninstall.
				Understanding package.json and package-lock.json.

				reating a simple Node.js application, Installing, updating, and removing packages:
				Node.js Core Modules : fs (File System),http/https (HTTP/HTTPS Servers and Clients) "path (File and Directory Paths) events (EventEmitter), Understanding package.json and package-lock.json."
				"Asynchronous Programming in Node.js : Callback Functions , Promises , Async/Await , More Built in Modules :Events and Errors, What is Express.js? Why use Express.js? Features and advantages Getting started with Express.js" "Creating a new Node.js project Installing Express.js in your project Basic Routing : Understanding routes in Express.js Creating routes for different HTTP methods (GET, POST, PUT, DELETE),Handling dynamic routes and parameters, Using route middleware"
	Day 19	08 August 2025	Introduction to Angular as a Framework	
			Introduction to Angular as a Framework	Introduction to Angular
				Key features and advantages
				Use cases where Angular is preferred over other frameworks
			Getting Started with Angular	Installing Angular CLI
				Understanding Just-In-Time (JIT) and Ahead-of-Time (AOT) compilation
				Creating a basic Angular application
			Building Blocks of Angular Applications	Angular Modules, Components, and Templates
				Creating and organizing Angular modules
				Creating components and their templates
			Angular Modules, Components, and Templates	Role of components in SPA (Single Page Application) development
				Creating and organizing Angular modules
				Creating components and their templates
				Role of components in SPA (Single Page Application) development
			Angular Binding	Property binding, event binding, and two-way binding

				Practical exercises: Building dynamic templates with data binding
	Day 20	09 August 2025	Advanced Angular Concepts	
			Angular Directives and Pipes	Built-in directives (ngIf, ngFor, ngClass, ngStyle)
				Custom directives and their use
				Using Angular Pipes for data transformation
				Practical exercises: Applying directives and pipes in a real-world example
			Component Styling and Communication	Inline, external, and scoped styles
				Best practices for styling Angular components
				Component Lifecycle Methods
				Understanding the lifecycle hooks (ngOnInit, ngOnChanges, etc.)
				Practical exercises: Implementing lifecycle hooks for dynamic behavior
	Day 21	11 August 2025	Component Communication	Passing data between parent and child components
				Using Input and Output decorators
				Practical exercises: Building a communication system between components
	Day 22	12 August 2025	Andvanced Angular Directives and Pipes Component Styling and Communication	Cont.. HTTP & Observables - Template Driven Forms - Reactive Forms
	Day 23	13 August 2025	Angular Advanced	Fetch Data Using HTTP
				Error Handling using HTTP
	Day 24	14 August 2025	Angular Advanced & Angular Forms	Template Driven Forms
				Reactive Forms
	Day 25	16 August 2025	**Milestone - 2 (Angular UI)**	
ASP .Net Core	Day 26	18 August 2025	.NET Core (Recap)	
			Middleware and Static Files	Understanding middleware in ASP.NET Core
				Configuring and using middleware components
				Serving static files (HTML, CSS, JavaScript)
				Security considerations with static files
			Introduction to Razor Pages	Overview of Razor Pages architecture

				Advantages of Razor Pages over traditional MVC
				Creating and configuring Razor Pages in a project
				Folder structure and naming conventions
			Razor Syntax and Page Model	Razor syntax basics and directives
				Mixing HTML and server-side code
				Understanding the PageModel class
				Property binding and handling requests
			Advanced .Net Core & Intro to MVC	
			Deep Dive into Razor Pages	Model binding in Razor Pages
				Binding complex types and collections
				Overview of different view types in Razor Pages
			Partial Views and Routing in Razor Pages	Creating and using partial views for reusability
				Implementing and configuring routing in Razor Pages
				Customizing routes and route parameters
			MVC Overview and Model Binding	Understanding the MVC pattern in ASP.NET Core
				Roles of Models, Views, and Controllers
				Setting up an MVC project
				Model binding in MVC: simple and complex types
	Day 27	19 August 2025	Validation in MVC applications	
			TagHelpers and HTML Helper Classes	Introduction to TagHelpers in ASP.NET Core
				Common TagHelpers for forms, links, etc.
				Using HTML Helper classes to generate HTML elements
				Custom TagHelpers and HTML Helpers
			Validations Overview and Data Annotations	Importance of data validation in web applications
				Using Data Annotations for server-side validation
				Common validation attributes and scenarios
			Server-Side and Client-Side Validation	Implementing server-side validation in MVC
				Setting up client-side validation with unobtrusive JavaScript
				Synchronizing server and client-side validations

				Build an MVC application incorporating cookies, sessions, and filters.
	Day 28	20 August 2025	Routing in MVC Application	
			Advanced Techniques	Implementing complex routing scenarios
				Dynamic routing based on conditions
				Using custom route constraints
			MVC filters	
			Advanced MVC Filters	Creating filters with dependencies
				Implementing filters for cross-cutting concerns (logging, error handling)
				Testing and debugging custom filters
	Day 29	21 August 2025	Sample MVC Application	
			Building a Full ASP.NET Core Application	Develop a full-featured ASP.NET Core application using Razor Pages and MVC
				Implement custom validations, filters, routing, and session management
				Focus on best practices and design patterns
ADO.Net, EF Core & Asp.Net Core Advanced	Day 30	22 August 2025	Database Connectivity Using ADO.NET	
			Database Connectivity Using ADO.NET	ADO . NET
				Introduction to ADO.NET
				Connected and Disconnected architecture.
				SQL Connection
				SQL Command
				SQL Injection and how to prevent it.
				Call Stored Procedure
				SQL Data Reader
				SQL Data Adapter
				Dataset and Datatable
	Day 31	23 August 2025	Database Connectivity using Entity Framework	
			EF Core Introduction	Overview of Entity Framework Core
				Differences between ADO.Net and EF Core
				Advantages of using an ORM (Object-Relational Mapping) tool
			EF Core Code First Approach	Setting up a Code First EF Core project
				Defining entities and relationships using code
				Configuring the database using Data Annotations and Fluent API
				Creating and applying migrations

				CRUD operations using EF Core Code First
			EF Core Database First Approach	Setting up a Database First EF Core project
				Reverse engineering a database into EF Core models
				Managing and modifying generated models
				CRUD operations using EF Core Database First
	Day 32	25 August 2025	Advanced EF Core and AJAX with MVC	
			Understanding Repository Design Pattern	Overview of the Repository Design Pattern
				Benefits of using the Repository Pattern in data access
				Implementing the Repository Pattern with EF Core
				Creating a generic repository for CRUD operations
			Basic CRUD Operations using Entity Framework Core	Implementing CRUD operations with EF Core
				Handling relationships and navigation properties
				Optimizing queries using LINQ
				Using asynchronous operations in EF Core
			Ajax with MVC	Introduction to AJAX and its use cases in MVC
				Making asynchronous calls to the server using AJAX
				Updating parts of the web page without reloading
				Integrating AJAX with MVC and EF Core
				Error handling and debugging in AJAX calls
	Day 34	26 August 2025	ASP.Net Core Advanced & Secure Coding Practices	
			Security Fundamentals and Authentication	Importance of input validation to prevent attacks (e.g., SQL Injection, XSS)
				Best practices for input validation in ASP.NET Core
				Output encoding to protect against XSS attacks
			Authentication and Authorization in ASP.NET Core	Overview of ASP.NET Core authentication and authorization
				Implementing role-based and claims-based authorization
				Configuring authentication schemes (e.g., cookies, JWT)
			Securing MVC Applications	Configuring secure forms authentication and authorization
				Protecting against common web vulnerabilities (CSRF, XSS, etc.)

				Implementing secure session management
	Day 35	27 August 2025	Advanced Security Practices	
			Authentication using JWT Token and OAuth	Understanding JSON Web Tokens (JWT) and their use in authentication
				Implementing JWT-based authentication in ASP.NET Core
				Overview of OAuth and its role in securing applications
			Secure Communication	Configuring HTTPS in ASP.NET Core
				Implementing secure communication using TLS/SSL
				Protecting sensitive data transmission
			Database Security & Security Practices in SDLC	Best practices for securing databases (e.g., encryption, secure connections)
				Secure coding practices during the Software Development Life Cycle (SDLC)
				Conducting security assessments and code reviews
Web API & Microservices	Day 36	28 August 2025	Rest & Microservice Architecture	
			Introduction to REST and Architecture	Overview of RESTful services and principles
				RESTful API design best practices in ASP.NET Core
				Understanding statelessness and resource-based routing
			Web Debugging Tools (Postman, Fiddler)	Using Postman for API testing and debugging
				Monitoring and troubleshooting HTTP requests with Fiddler
				Practical tips for API debugging
			Associations, URI Routing, and Attribute Routing	Implementing associations in Web API (one-to-many, many-to-many)
				Configuring URI routing for RESTful endpoints
				Customizing routes with attribute routing in ASP.NET Core
			Microservices Architecture and Implementation	Introduction to microservices architecture
				Comparing microservices with monolithic architecture
				Benefits and challenges of microservices
			Implementing Microservices with Ocelot Gateway	Introduction to API Gateway and its role in microservices
				Implementing Ocelot as an API Gateway in ASP.NET Core
				Configuring routing, aggregation, and security in Ocelot

			Introduction to RestTemplate	Overview of RestTemplate for HTTP communication between microservices
				Best practices for inter-service communication in a microservices environment
				Error handling and fault tolerance strategies in microservices
Application testing and Integration	Day 37	29 August 2025	Backend Integration and UI Prototyping	
			Backend Integration and Deployment	Integrating with Backend APIs
				Making HTTP requests using Angular's HttpClient
				Practical exercises: Fetching and displaying data from a backend API
			Deployment of Angular Applications	Optimizing Angular applications for production
				Deploying to platforms like Firebase Hosting or AWS Amplify
				Practical exercises: Deploying an Angular application and testing it live
			Prototyping and UX Design in Angular	Introduction to UX principles
				Tools for prototyping (Figma, Adobe XD)
				Translating prototypes into Angular components
				Practical exercises: Prototyping and implementing a user interface
			Creating Reusable Angular Components	Best practices for reusable components
				Building and documenting a component library
				Practical exercises: Creating a shared component library for forms, buttons, etc.
			State Management in Angular	
			Overview of state management tools in Angular	RxJS
				NgRx (Redux-inspired library)
				Understanding Observables and Subjects for managing state.
				Reactive programming concepts and their role in state management.
			State Management Using RxJS	Practical exercises:
				Building a simple service to manage application state using RxJS.
				Implementing a shared state for components (e.g., user authentication status).
				Building a simple service to manage application state using RxJS.

			NgRx (Redux-inspired library)	Core concepts of NgRx:
				Store, Actions, Reducers, Effects, Selectors.
				Advantages of using NgRx for global state management.
				NgRx vs. other state management tools like Akita or standalone RxJS.
	Day 38	30 August 2025	**Milestone - 3 (Dotnet Core)**	
	Day 39	01 September 2025	Fundamentals of Power Platform - Need to Exclude	
			Introduction to Power Platform	Overview of Power Platform
				Components of Power Platform
				Introduction to Power BI & Power Apps
				Types of Power Apps
				Building a Simple App
			Automating Processes with Power Automate	Introduction to Power Automate
				Types of Flows
				Common Use Cases
			Introduction to Power Virtual Agents	Overview of Power Virtual Agents
				Building a Basic Chatbot
				How Power Platform Components Work Together
				Business Use Cases
Devops	Day 40	02 September 2025	Cloud Intro & Deployment **(Parallely Capstone Project to be allocated)**	Cloud Intro
				Deployment of project on cloud
			DevOps	Devops & CI/CD Intro and it's tools
			Introduction to Version Control	What is version control and why it is essential?
				Centralized vs. Distributed version control systems.
				Git Basics, Branching and Merging working with Remote Repositories
			Implementing CI/CD	What is CI/CD and why is it important?
				Key concepts: Build, Test, Release, Deploy.
				Tools for CI/CD: Jenkins, GitHub Actions, GitLab CI, etc.
			Docker	Docker, Docker Compose
			Kubernetes & SonarQube	Introduction to Kubernetes, Auto Scale, KEDA
				Scripting Technologies (Terraform, Powershell)
				SonarQube Code Code Quality Automation
Capstone	Day 41-45	03 September 2025 - 06 September 2025	**Capstone Project**	

		08 September 2025	**Final Assessment - Only MCQ+case study**