

Program Structure

Courses	Day	Date	Modules	SubTopics
Introduction to .Net & C# & OOPS using C# & Data Handling using C#	Day 1	21 July 2025	Getting started with Git basics	
			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 it is important?
				Key concepts: Build, Test, Release, Deploy.
				Tools for CI/CD: Jenkins, GitHub Actions, GitLab CI, etc.
			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	22 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	23 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	24 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.

	Day 5	25 July 2025	Exception handling	
			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	26 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
				Extension Methods
			Latest C# 7.0 features	Tuples and Deconstruction, Pattern Matching, Local Functions, Out Variables, Ref Locals and Returns, Discards (_) & Expression-bodied Members
				Nullable Reference Types, Async Streams, Ranges and Indices, Switch Expressions, Default Interface Methods, Pattern Matching Enhancements, Using Declarations & Readonly 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
			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
			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

	Day 9	30 July 2025	Handling failures and debugging failing tests	
			.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 10	31 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

SQL & microsoft SQL server				Overview of common design patterns (Creational, Structural, Behavioral)
			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 11	01 August 2025	Milestone Assessment 1 (C# Fundamentals)	
	Day 12	02 August 2025	DDL, DCL, and TCL Commands	
			SQL Fundamentals	SQL commands
				Constraints
				Primary key
				Foreign key
				Types of constraints - Not null, Check, Unique.
				DDL Commands
				DCL & TCL Commands
				Grant & Revoke, Commit & Rollback
	Day 13	04 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 Procedures and Triggers	Stored procedure
				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	05 August 2025	Advanced Queries, Functions, and Joins	
			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	06 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	Day 16 & Day 17 (Focus More on Java Script)	07 August 2025	HTML /CSS /JavaScript	
			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, A11Y (Accessibility)
				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	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	Basics of JavaScript - Introduction to JavaScript, Data type, variables, Functions and scope		
					Type Conversions, Basic Operators		
					Branching, Conditional statements and Looping Statements, Functions, Arrays and Strings		
			08 August 2025	Advanced Java Script	Modern JavaScript (ES6): Javascript - Fetch API , Arrow functions, Template literals, Destructuring, Spread and rest operators		
					Date and Time Objects, Closures, Promises and Async Programming, Closures and Scoping,		
					DOM Manipulation: DOM Objects, Accessing elements in the DOM, Modifying HTML content, Adding and removing elements		
					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		
	Day 18	09 August 2025	Milestone Assessment 2 (SQL Fundamentals)				
Getting started with React FrontEnd	Day 19	11 August 2025	SPA & Working with NPM				
			Understanding the Need of SPA (Single Page Application):	Differences between SPA and traditional web applications			
				Advantages of SPA in terms of performance and user experience			
				Common use cases for SPA development			
			Working with NPM	Introduction 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.			
			Day 20	12 August 2025	React Basics and Component Architecture		

			React Core Fundamentals: Understanding React as a Framework	Key features/advantages React vs Angular use cases
			Component Lifecycle	Mounting/Updating/Unmounting phases Lifecycle methods
			Components, States, and Props	Functional vs class components State management Prop passing
	Day 21	13 August 2025	React Router & Events: Events and Passing Props	onClick/onChange handlers Lifting state up
			React Router	Route configuration Dynamic routes Navigation guards
			JWT Authentication Basics	Token storage Auth context
	Day 22	14 August 2025	State Management: Refactoring with Hooks	useState/useEffect useContext
			Redux & Flux	Store setup Actions/reducers Dispatch
	Null Day	15 August 2025	Independance day Holiday	
	Day 23	16 August 2025	Advanced Patterns : Reusable Components	Compound components Prop patterns
			Test-Driven Development	Jest/RTL setup Test cases
ASP .Net Core	Day 24	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
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				Understanding the PageModel class
				Property binding and handling requests
			Advanced Queries, Functions, and Joins	

			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 25	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
			Validation in MVC application	
			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 26	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 27	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
	Day 28	22 August 2025	Milestone - 3 (React UI)	

Asp.Net Core Advanced	Day 29	23 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 30	25 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 31	26 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
				Introduction to microservices architecture

			Microservices Architecture and Implementation	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
			Core Security	
			Input Validation	Client-side vs server-side validation DataAnnotations (Required, StringLength) Custom validation attributes FluentValidation for complex rules
			Output Encoding	HTML encoding (AntiXSS Library) JavaScript encoding URL encoding Context-aware encoding strategies
Application testing and Integration	Day 32	28 August 2025	Authentication	Cookie-based auth JWT structure (Header/Payload/Signature) Refresh token rotation OAuth 2.0 flows (PKCE, Client Credentials)
			Secure MVC	CSRF tokens (AntiForgery) Content Security Policy (CSP) Secure headers (XSS-Protection, HSTS)
			API & Microservices	
			REST Architecture	Richardson Maturity Model Resource naming conventions Status code semantics Hypermedia (HATEOAS)
			API Tools	Postman collections/environments Fiddler for traffic inspection Swagger/OpenAPI documentation
			Microservices	Gateway routing (Ocelot) Service discovery Circuit breaker pattern (Polly) RestTemplate retry policies
			Full-Stack Security	
			Frontend Security	TypeScript types/interfaces JS closures/IIFEs for encapsulation DOM XSS prevention Safe DOM manipulation

	Day 33	29 August 2025	Database Security	Parameterized queries ORM security (EF Core) Encryption at rest (Always Encrypted) Row-level security
			SDLC Practices	Threat modeling (STRIDE) SAST tools (SonarQube) Secure code reviews Incident response
			Fundamentals of Power Platform	
			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
	Day 35	30 August 2025	Milestone - 4 (Dotnet Core)	
Capstone	Day 34 - 41	29th Aug - 4th Sep	Capstone Project (5 days)	
		05 September 2025	Final Assessment - Only MCQ+case study	