

# .NET MAUI Fundamentals Training Course: Building Cross-Platform Apps with C#

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Tashkent

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## Overview

.NET MAUI Fundamentals Training Course: Building Cross-Platform Apps with C# is a two-week course for software engineers, mobile developers, and enterprise architects who need a unified cross-platform application codebase. Participants address the complexity of maintaining separate codebases across Android, iOS, macOS, and Windows by establishing a shared C# and XAML development workflow. The curriculum integrates Model-View-ViewModel architecture, dependency injection, RESTful service consumption, and local SQLite data caching while addressing secure mobile deployment requirements. Agile Leaders Training Center delivers this .NET MAUI fundamentals course.

## Who Should Attend

- Software engineers responsible for writing cross-platform C# business logic
- Mobile developers responsible for building multi-platform user interfaces in XAML
- Enterprise architects responsible for structuring Model-View-ViewModel client architectures
- Systems developers responsible for integrating backend RESTful APIs and offline SQLite storage
- Application security leads responsible for mobile device security controls and data encryption

The course assumes participants can write C# code and interpret object-oriented programming patterns; enterprise cloud hosting, backend server administration, and store publisher account governance remain outside the course.

## Departments and Industries

The course supports cross-platform client development across financial services, commercial logistics, digital healthcare, enterprise retail, and industrial operations.

- Mobile application engineering
- Enterprise software architecture
- Digital customer channels
- Information security and application assurance
- Retail systems development

## Learning Objectives

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

- Build cross-platform client interfaces using shared C# and XAML components across mobile and desktop platforms
- Apply the Model-View-ViewModel pattern with dependency injection to decouple presentation logic from data layers
- Evaluate RESTful service endpoints and parse structured JSON payloads within asynchronous HTTP client pipelines
- Build local relational data storage using SQLite integration for resilient offline application performance
- Analyze mobile client security configurations against National Cybersecurity Authority ECC-2:2024 baseline controls and encryption requirements
- Prioritize data protection controls under the Personal Data Protection Law to meet technical safeguards and breach notification readiness

## Course Agenda

### Day 1: .NET MAUI Architecture and Environment

- .NET MAUI Multi-platform Project Architecture and Solution Structure
- C# and Shared Codebase Configuration Across Android, iOS, macOS, and Windows
- Visual Studio and Development Tooling Setup for Multi-Target Compilations
- Platform-Specific Code Isolation and Conditional Compilation Directives
- Application Lifecycle Management and Window Initialization Workflows

### Day 2: XAML Layouts and UI Components

- XAML Syntax Rules and Visual Element Hierarchy Definition
- StackLayout, Grid, and FlexLayout Responsive Design Containers
- ContentPage and ScrollView Interface Implementation
- Control Customization Using Reusable Platform Handlers and Styles
- Localization Resources and Dynamic Device Resource Dictionaries

### Day 3: Navigation and Shell Framework

- .NET MAUI Shell Hierarchical Route Architecture
- Flyout, TabBar, and Navigation Page Interface Mapping
- Route-Based URI Parameter Passing and Navigation Stack Control
- Modal Window Presentation and Back-Button Handling Rules
- Role-Based Page Access and Dynamic Shell Menu Registration

### Day 4: MVVM Pattern and Data Binding

- Model-View-ViewModel Architectural Separation and Component Mapping
- INotifyPropertyChanged Interface Implementation and Observable Objects
- One-Way, Two-Way, and Command Binding Configurations in XAML
- CollectionView Data Binding with ObservableCollection Structures
- IValueConverter Implementation for Presentation Data Formatting

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## Day 5: Dependency Injection and Component Decoupling

- Dependency Injection Container Configuration in MauiProgram Startup
- Service Lifetime Registration Using Transient, Scoped, and Singleton Patterns
- ViewModel and Service Constructor Injection Techniques
- Platform-Specific Interface Abstraction via Dependency Services
- Unit Testing Workflows for Decoupled ViewModels and Services

## Day 6: RESTful Web Services and Asynchronous HTTP

- HttpClient Configuration and Network Lifecycle Management
- Asynchronous RESTful API Consumption Using System.Text.Json Serialization
- HTTP Status Code Handling and Network Resilience Policies
- Secure Token Storage and Authorization Header Interceptor Pipelines
- API Payload Validation and Structured Exception Handling Protocols

## Day 7: Local Data Storage with SQLite

- SQLite-net-pcl Integration and Asynchronous Database Connections
- Data Model Definition with Primary Keys and Query Attributes
- CRUD Operation Implementation with SQLite Async Operations
- Offline Data Synchronization Logic and Conflict Resolution Rules
- In-Memory Caching and SQLite Query Optimization Techniques

## Day 8: Device Features and Native Platform Integration

- Microsoft.Maui.Devices Hardware Sensor and Battery State API Integration
- SecureStorage and Preferences APIs for Sensitive Credential Management
- Geolocation and Mapping Service Integration Protocols
- Cross-Platform File System Access and App-Data Directory Governance
- Platform Permission Requests and Runtime Access Validation Methods

## Day 9: Mobile Security and Regulatory Compliance

- NCA ECC-2:2024 Control 2-6 Mobile Device and BYOD Security Implementation
- NCA ECC Control 2-8 Cryptographic Key Lifecycle and In-Transit Encryption
- Vulnerability Assessment and Penetration Testing Preparation under NCA CSCC-1:2019
- SDAIA Personal Data Protection Law Article 23 Technical Measure Alignment
- Telemetry Logging Architecture for PDPL Article 24 Breach Notification Deadlines

## Day 10: Integration Testing and Capstone Deployment

- Exercise: Cross-Platform Shell Navigation and MVVM Binding Review
- Exercise: SQLite Offline Cache and Resilient RESTful Sync Verification
- Exercise: NCA Baseline Security Audit and Encryption Validation
- Exercise: PDPL Data Subject Request Data Extraction Verification
- Capstone Exercise: End-to-End Enterprise .NET MAUI Application Implementation

## Practical Exercises

Suggested activities translate architectural concepts into verified cross-platform application implementations.

- Suggested activity: configure a multi-platform .NET MAUI Shell interface with MVVM data bindings
- Suggested activity: build an asynchronous RESTful client pipeline with SQLite offline local storage
- Suggested activity: audit mobile encryption mechanisms against NCA ECC-2:2024 baseline controls
- Suggested activity: implement a complete cross-platform enterprise client application

## FAQs

### Who should attend the .NET MAUI Fundamentals Training Course and what does it assume?

The course suits software engineers, mobile developers, enterprise architects, and application security leads. It assumes familiarity with C# programming and object-oriented fundamentals; backend infrastructure management and cloud deployment governance are omitted.

### How does the .NET MAUI Fundamentals Training Course differ from native Android or iOS development training?

It unifies development under a single shared C# and XAML codebase targeting Android, iOS, macOS, and Windows simultaneously, avoiding duplicate native platform codebases while supporting direct native device API integration.

### Which security standards are addressed in this .NET MAUI cross-platform development course?

The course addresses National Cybersecurity Authority ECC-2:2024 mobile controls, NCA CSCC-1:2019 security testing rules, and SDAIA Personal Data Protection Law requirements for encryption, data subject rights, and breach notification architectures.

## What work products do developers construct during the .NET MAUI Fundamentals Training Course?

Participants construct a production-ready cross-platform application codebase incorporating Shell navigation, MVVM bindings, SQLite offline caching, secure HTTP pipelines, and regulatory security configurations.

## Conclusion

Participants complete the course equipped with a verified cross-platform application codebase built on MVVM architecture and secure storage patterns. This implementation package establishes traceable code sharing across Android, iOS, macOS, and Windows while meeting local regulatory security baselines. Organizations achieve shorter multi-platform release cycles and reduced compliance exposure across enterprise mobile initiatives.