

Unified Mobile Application Development (Native and Cross Platform)

Course Duration: 40 Hours

Course code: UMAD-NCP-101

1. Course Overview

This five-day course provides a comprehensive understanding of mobile application development using both native and cross-platform approaches. Learners will explore platform-specific development (Android & iOS) alongside modern cross-platform frameworks such as .NET MAUI, Flutter, and React Native. The course focuses on building scalable, high-performance applications while understanding when to choose native vs cross-platform solutions.

2. What you'll learn?

By the end of the course, you will be able to:

- Understand the mobile app development ecosystem and architectures
- Differentiate between native and cross-platform development approaches
- Build native applications for Android and iOS
- Develop cross-platform applications using modern frameworks
- Design responsive and user-friendly mobile interfaces
- Integrate APIs, device features, and third-party services
- Handle performance optimization and platform-specific challenges
- Deploy applications to app stores (Google Play & Apple App Store)

3. Target Audience

- Aspiring mobile app developers
- Software developers transitioning to mobile development
- Full-stack developers exploring mobile technologies
- Students and IT professionals interested in app development

4. Pre-Requisites

Before taking this course, you should have:

- Basic knowledge of programming (C#, Java, JavaScript, or similar)
- Understanding of object-oriented programming concepts
- Familiarity with development tools (IDE like Visual Studio, Android Studio, etc.)
- Basic understanding of web or software development concepts (preferred)

5. Course content

Module 1: Course Introduction

- Introduction and course logistics
- Overview of mobile application development
- Course objectives and learning outcomes

Module 2: Mobile Development Ecosystem Overview

- Evolution of mobile applications
- Native vs cross-platform vs hybrid apps
- Market trends and technology stack comparison
- Choosing the right development approach

Module 3: Native Android Development

- Introduction to Android architecture
- Setting up Android Studio
- Activities, fragments, and UI components
- Working with layouts and resources
- Handling user input and navigation

Module 4: Native iOS Development

- Introduction to iOS architecture
- Xcode and Swift basics
- Storyboards and UI design

- Navigation and view controllers
- App lifecycle in iOS

Module 5: Cross-Platform Development Fundamentals

- Introduction to cross-platform frameworks
- Benefits and limitations
- Shared codebase concept
- UI consistency across platforms

Module 6: Building Apps with .NET MAUI

- MAUI architecture and setup
- Creating cross-platform UI with XAML
- Data binding and MVVM
- Accessing device features

Module 7: Building Apps with React Native / Flutter

- Overview of React Native and Flutter
- UI components and widgets
- State management basics
- Navigation and routing

Module 8: API Integration and Backend Connectivity

- RESTful API consumption
- JSON data handling
- Authentication and authorization
- Error handling and retries

Module 9: Working with Device Features

- Accessing camera, GPS, and sensors
- Push notifications

- File storage and media handling

Module 10: UI/UX Design Principles for Mobile Apps

- Mobile-first design approach
- Responsive layouts
- Accessibility considerations
- Performance-friendly UI design

Module 11: Performance Optimization

- Memory management
- Reducing app load time
- Optimizing API calls
- Debugging performance issues

Module 12: Testing and Debugging

- Unit and UI testing
- Emulator vs real device testing
- Debugging tools and techniques

Module 13: Security Best Practices

- Secure data storage
- API security
- Handling user permissions
- Protecting against vulnerabilities

Module 14: Deployment and Publishing

- Preparing apps for release
- App signing and packaging
- Publishing on Google Play Store
- Publishing on Apple App Store

Module 15: Capstone Project

- Build a complete mobile application using:
- Native or cross-platform approach
- API integration
- Device features
- Testing, optimization, and deployment

