Android Mobile Application Development

Duration: 8 days / 64 hours
Prerequisites: Working knowledge of Any OOPS Programming Language

Day 1: Introduction to Android & Kotlin Basics

Topics Covered:

- Overview of Android OS and architecture
- Android Studio setup and emulator usage
- Kotlin Basics:
    - Variables and Data Types
    - Conditional Statements
    - Loops
    - Functions and Lambdas

Hands-on Labs:

- Set up Android Studio
- "Hello World" Kotlin app with a button click counter

Day 2: Object-Oriented Kotlin and Android Fundamentals

Topics Covered:

- Object-Oriented Kotlin:
    - Classes, Objects, Inheritance
    - Interfaces and Abstract Classes
    - Extension Functions and Null Safety
- Android App Components:
    - Activity Lifecycle
    - Intents and Navigation
    - Toasts and Logs

Hands-on Labs:

- Create a multi-activity app with data passing
- Use logs and toasts for debugging

Day 3: Introduction to Jetpack Compose

Topics Covered:

- Basics of Jetpack Compose
- Composable Functions
- Layouts (Column, Row, Box)
- Modifiers and Styling
- State Management (remember, mutableStateOf)

Hands-on Labs:

- Create a form UI using Jetpack Compose
- Dynamic text update based on user input

Day 4: Advanced Jetpack Compose & Accessibility

Topics Covered:

- LazyColumn and Lists
- Navigation in Compose
- Material Design in Compose
- Accessibility in Android:
    - TalkBack
    - Content Descriptions
    - Accessibility Scanner

Hands-on Labs:

- Build a notes list app with navigation
- Add accessibility labels and test with TalkBack

Day 5: REST API Integration

Topics Covered:

- Retrofit library for API Calls
- JSON Parsing with Gson or Moshi
- Coroutines for network requests
- Error Handling and Retry Logic

Hands-on Labs:

- Build a weather app using Retrofit
- Display live weather data in UI

Day 6: Design Patterns in Android

Topics Covered:

- Builder Pattern
- Adapter Pattern
- MVVM Architecture
- Clean Architecture Principles

Hands-on Labs:

- Implement MVVM with ViewModel and LiveData
- Refactor previous weather app using Clean Architecture layers

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Day 7: Modern Concurrency in Kotlin

Topics Covered:

- Introduction to Kotlin Coroutines
- Coroutine Scopes (Global, ViewModel, Lifecycle)
- Flow and LiveData
- Structured Concurrency

Hands-on Labs:

- Use Coroutine and Flow for API and UI updates
- Parallel data loading with async/await

Day 8: Unit Testing and Final Project

Topics Covered:

- Introduction to Unit Testing with JUnit
- Mockito basics
- Testing ViewModels and UseCases
- UI Testing with Espresso (intro only)

Hands-on Labs:

- Write unit tests for ViewModel and Repository
- Final Capstone Project: A functional app using Compose, MVVM, API integration, and tests