ANDROID KOTLIN PROGRAMMING COURSE OUTLINE

Lesson 1: Introduction to Kotlin

- Overview of Kotlin and its Role in Android Development
- Basic Syntax and Structure of Kotlin Programs
- Setting Up the Development Environment
- Variables and Data Types
- User Input Handling
- Comments and main() function

Lesson 2: Control Flow Statements and Functions

- Overview of Control Flow
- Basic Control Structures (If, When, If-Else)
- Introduction to Functions

Lesson 3: Object-Oriented Programming (OOP) in Kotlin

- Key Concepts of OOP in Kotlin
- Working with Classes and Objects
- Inheritance, Abstract Classes, and Interfaces

Lesson 4: Android Framework and Android Studio

- Android Platform Architecture and Components
- Overview of Android Studio IDE
- Setting Up an Android Project
- Running Android Apps on Emulators and Physical Devices

Lesson 5: Creating User Interfaces in Android

- Introduction to Android Views and Layouts
- Configuring Layouts Programmatically with Kotlin
- Working with Basic UI Components (Text, Images, Buttons)

Lesson 6: Advanced UI Components and Layouts

- Overview of Advanced Layouts
- Constraint Layout
- Linear Layout
- Relative Layout
- Working with Styles and Themes in Android
- Creating Menus and Customizing App Icons

Lesson 7: Handling Navigation and User Interaction

- Activity Lifecycle Management
- Navigating Between Activities with Intents
- Handling User Inputs with Dialogs and Notifications
- Snack bar, Alert Dialog, and Notifications Overview

Lesson 8: Working with Android Widgets

- Introduction to Android Widgets
- Progress Bar, Seek Bar
- Date and Time Picker Dialogs
- Calendar View and Web View
- Customizing Widgets for Enhanced User Experience

Lesson 9: Implementing Android Navigation Components

- Overview of Android Navigation Components
- Implementing Bottom Navigation and Drawer Menus
- Working with Recycler View, Search View, and Tab Layout
- Handling Data in Spinners and AutoCompleteTextView

Lesson 10: Firebase Authentication and Database Integration

- Room
- Room Encryption
- SQLite
- DataStore
- Offline-first Architecture
- Background processing with WorkManager

Lesson 11: Testing and Publishing Android Apps

- Overview of App Testing Strategies
- Usability Testing and Feedback Collection
- Using Firebase Test Lab for Automated Testing
- Preparing and Publishing Your App on Google Play Store
- Key Considerations for App Release
- Managing App Versions and Updates Lesson 13: Migration, App Versioning and Production level scenarios
- Android implementation of App Versioning and Update Strategies such as:
    - Incremental updates,
    - Major updates,
    - Phased Rollouts
- Best practices for Versioning and how to maintain backward compatibility

Lesson 12: Design Patterns in Android

- Introduction to Common Design Patterns
- Implementing MVVM and MVP Patterns
- ViewModel
- StateFlow
- Repositories
- Dependency Injection with Hilt/Koin

Lesson 13: Testing Techniques – Unit testing

- Differences between unit, integration, and UI testing
- Android Testing Overview
- The role of unit testing in Android development
- Testing frameworks (Junit, Mockito)
- JUnit Framework Basics
- Introduction to Junit
- JUnit test lifecycle: @Before, @Test, @After, etc.
- Writing and running simple unit test cases using Junit
- Configuring dependencies for unit testing (Junit)
- Common Assertions in Junit
- Introduction to assertions (assertEquals, assertTrue, assertFalse, etc.)
- Handling exceptions in tests using assertThrows
- Testing Android Components
- Writing tests for ViewModels and Repository classes
- Introduction to Appium
- What is Appium?
- Differences between Unit Testing and UI Testing
- Appium architecture and how it interacts with Android apps
- Setting Up Appium for Android Testing
- Installing and configuring Appium
- Installing Appium Desktop and Appium Inspector
- Connecting to an Android emulator
- Basic Concepts in Appium
- Understanding Desired Capabilities
- Locators: XPath, ID, class name, and others
- Creating Your First Appium Test
- Writing Appium tests in Kotlin
- Navigating an Android app using Appium commands
- Locating elements using XPath, IDs, and accessibility IDs
- Interacting with UI elements: clicks, input text, swiping

- Integrating Unit Testing with Appium
- Combining Unit Tests and UI Tests
- Understanding the role of Appium in end-to-end testing
- Best practices for separating unit and UI tests
- Running Appium Tests with Kotlin
- Setting up Appium tests alongside unit tests
- Using TestRunner in Android Studio

Lesson 14: Crash Handling and Debugging

- Strategies for Managing App Crashes
- Tools and Techniques for Debugging and Crash handling in Production

Lesson 15: Security in Android Apps

- Protecting Sensitive Data
- Local Data Security and Permissions Management
- Biometric Authentication

Lesson 16: APK Security

- Understanding the Threat Landscape
- Code Obfuscation Techniques
- Anti-Debugging Techniques
- Introduction to ProGuard tool, its basic configuration, and how it works to shrink, optimize, and obfuscate code.

Lesson 17: Networking

- REST APIs
- Retrofit, OkHttp
- JSON Serialization
- Coroutines
- Error Handling
- Authentication
- Token Management