

Android with Kotlin & Jetpack Compose (6-Week Industry-Oriented Syllabus)

Week 1 – Kotlin Programming Fundamentals

Module 1: Introduction to Android Development

- Android Architecture
- Android Studio Installation & Setup
- Project Structure
- Emulator & Physical Device Setup
- Gradle Basics

Module 2: Kotlin Basics

- Variables and Data Types
- Operators
- Control Statements
- Loops
- Functions
- Collections (List, Set, Map)
- Null Safety
- Extension Functions
- Scope Functions
- Exception Handling

Hands-on

- Calculator Application
- Number Guessing Game
- Student Grade Management

Assignment

Build a Console-Based Student Management System.

Week 2 – Jetpack Compose UI Development

Module 3: Introduction to Compose

- Why Jetpack Compose?
- Composable Functions
- Material Design 3
- Layouts
 - Column
 - Row
 - Box
 - LazyColumn
 - LazyGrid

Module 4: UI Components

- Text
- Button
- Image
- Icon
- TextField
- Checkbox
- Radio Button
- Switch
- Card
- Scaffold

- Snackbar
- Dialogs

Module 5: State Management

- State
- remember
- rememberSaveable
- MutableState
- State Hoisting

Hands-on

- Login Screen
- Registration Screen
- Dashboard UI
- Food Delivery UI Clone

Assignment

Create a Multi-Screen Shopping UI using Jetpack Compose.

Week 3 – Android Components & Architecture

Module 6: Android Architecture

- MVVM
- Clean Architecture Overview
- SOLID Principles
- Repository Pattern

Module 7: ViewModel & Lifecycle

- ViewModel
- Lifecycle
- SavedStateHandle

Module 8: Navigation

- Navigation Compose
- Passing Arguments
- Bottom Navigation
- Navigation Drawer

Module 9: Coroutines & Flow

- Coroutine Scope
- suspend Functions
- Launch vs Async
- StateFlow
- SharedFlow

Hands-on

- Notes Application
- Task Manager

Assignment

Develop a To-Do Application using MVVM.

Week 4 – Networking, Database & Firebase

Module 10: REST APIs

- HTTP Basics

- JSON
- Retrofit
- Gson / Kotlin Serialization
- Error Handling

Module 11: Local Database

- Room Database
- Entity
- DAO
- Repository
- Offline Storage

Module 12: Firebase

- Firebase Authentication
- Firestore Database
- Firebase Storage
- Crashlytics
- Analytics

Module 13: Dependency Injection

- Hilt Basics
- Dependency Injection Concepts

Hands-on

- Weather Application
- News App
- Expense Tracker

Assignment

Build a News Application using REST API + Room Database.

Week 5 – Advanced Android Development

Module 14: Modern Android Libraries

- DataStore
- WorkManager
- Permissions
- Camera Integration
- Image Picker
- Location Services
- Google Maps
- Notifications

Module 15: Performance Optimization

- Recomposition
- Performance Best Practices
- Memory Leak Detection
- Debugging
- Logging

Module 16: Version Control

- Git
- GitHub
- Branching
- Pull Requests

Hands-on

- Photo Gallery App
- Location Tracker
- Attendance App

Assignment

Develop a Travel Guide Application using Maps and Location APIs.

Week 6 – AI Integration & Capstone Project

Module 17: AI in Android

- Introduction to AI APIs
- Prompt Engineering Basics
- Generative AI Concepts
- AI Chat Integration
- Image Recognition Basics
- OCR Integration

Module 18: Deployment

- APK Generation
- App Signing
- Play Store Publishing Process
- App Bundle (AAB)
- Release Checklist

Module 19: Career Preparation

- Android Interview Questions
- Resume Building
- GitHub Portfolio

- LinkedIn Profile Optimization
- Freelancing Roadmap

Capstone Project (Choose One)

- AI Expense Tracker
 - AI Image Caption Generator
 - Smart Notes with AI Summarization
 - AI Recipe Generator
 - AI Chat Assistant
 - E-Commerce Application
 - Healthcare Appointment App
 - Food Delivery Application
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Mini Projects Throughout the Course

- Calculator
 - Login UI
 - Notes App
 - To-Do Manager
 - Weather App
 - News App
 - Expense Tracker
 - Camera App
 - Maps App
 - AI Chat App
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Course Deliverables

-  10+ Hands-on Applications
 -  1 Industry-Level Capstone Project
 -  Source Code for All Projects
 -  Assignments & Practice Exercises
 -  Interview Preparation Sessions
 -  Resume & GitHub Portfolio Guidance
 -  Certificate of Completion
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Tools & Technologies Covered

- Kotlin
- Android Studio
- Jetpack Compose
- Material Design 3
- MVVM Architecture
- Coroutines
- StateFlow & SharedFlow
- Navigation Compose
- Retrofit
- Room Database
- Hilt
- Firebase
- DataStore
- WorkManager
- Google Maps
- CameraX

- Git & GitHub
- REST APIs
- Generative AI APIs (Gemini/OpenAI or equivalent)

Learning Outcome

By the end of this 6-week program, learners will be able to:

- Build modern Android applications using Kotlin and Jetpack Compose.
- Apply MVVM and Clean Architecture to create scalable, maintainable apps.
- Integrate local databases, REST APIs, Firebase, and AI-powered features.
- Use modern Android development tools and libraries effectively.
- Develop a portfolio-ready capstone project suitable for internships and entry-level Android developer roles.