Beginner's Guide to Android App Development with XML and Jetpack Compose

Module 1
Basics of Kotlin Programming
- Introduction to Kotlin
- Android Studio Setup
- Kotlin Variables and Data Types
- Control Flow (if, when, loops)
- Functions and Lambdas
- Higher-order functions and Lambdas
- Object-Oriented Programming in Kotlin (Class, Object, Inheritance, Abstract Class)
- Kotlin Collections
- Null Safety
- Coroutines basics

Practical Lab:
- Set up Kotlin in Android Studio
- Write a simple Kotlin program demonstrating variables, data types, and control flow
- Create classes and objects, demonstrating inheritance and use collections.

Module 2
Overview of Android Development
- Introduction to Android OS
- Android Platform architecture
- Components of Android Application
- Project Structure and Components

Practical Lab:
- Create a new Project and modify it to give a "Hello World" app
- Explore the project structure

Module 3
XML Based UI development
- Introduction to XML in Android
- Activities and Activity Lifecycle
- Commonly Used Layouts: Linear Layout, Relative Layout, Constraint Layout
- View Hierarchy and UI Components (Text Box, Image, Buttons etc)
- Alerts and Notifications

Practical Lab:
- Design a simple user interface using Linear Layout and Relative Layout
- Create a more complex UI using Constraint Layout
- Add basic UI components like Buttons and Text Views to produce alerts and Notifications.

Module 4
Advanced UI Components
- Recycler View and Adapters

- Card View
- Navigation Components (Bottom AppBar, Drawer widgets etc)

Practical Lab:
- Implement a Recycler View with a custom adapter
- Create a Card View layout and use inside the Recycler View
- Use Navigation components to enhance UI

Module 5
Getting Started with Jetpack Compose
- Introduction to Jetpack Compose
- Comparing Compose with traditional XML based UI development
- Setting up a Compose project and creating a simple Composable function
- Understanding basic Composables
- Adding interactivity with Composable functions
- Responding to User actions
- Using Layouts: Column, Row, Box

Practical Lab:
- Set up a new project using Jetpack Compose
- Create a simple UI using basic Compose components

Module 6
Navigation and Theming in Compose
- Navigation in Compose
- Passing Data to Composable
- Create Custom Composable
- Create Dynamic Lists with Lazy Column and Row
- Themes and Styles
- Material Design in Compose

Practical Lab:
Implement navigation between screens in a Compose app
Apply themes and styles to a Compose app to make the app more appealing

Module 7
MVVM Pattern and State management in Compose
- MVVM Pattern
- Managing State in Compose
- Modifiers and UI Customization

Practical Lab:
Manage state in a Compose application, following the MVVM pattern
Customize UI with modifiers

Module 8
Firebase Authentication and Databases in Compose
- Room Library for Local Data storage
- Firebase Setup
- Firebase Authentication

- Firebase Database for Cloud Data storage

Practical Lab:

Create a Room database and perform CRUD operations in a Compose app

Implement user authentication using Firebase

Module 9

JSON and Retrofit

- Introduction to JSON
- Making network requests with Retrofit
- Parsing JSON responses

Practical Lab:

- Make a network request using Retrofit
- Parse JSON data and display it in a Compose UI
- Handle API responses and errors

Module 10

Final Project

- Project Planning and Design
- Best Practices and Optimization
- Develop a complete Android app