Android Development Syllabus

Introduction to Android Development

- ✓ History and evolution of Android
- ✓ Overview of Android versions and features
- ✓ Android ecosystem: Devices, Android Studio, Gradle
- ✓ Understanding the Android market and career opportunities

Setting Up the Development Environment

- ✓ Installing Android Studio and SDK
- ✓ Configuring AVD (Android Virtual Device)
- ✓ Introduction to Gradle and its build system
- ✓ Debugging and testing tools in Android Studio

Core Concepts of Android Development

- ✓ **Architecture of Android:**
  - Application components: Activities, Services, Broadcast Receivers, Content Providers
  - Android Runtime (ART) and Dalvik VM
- ✓ **Android Manifest File:**
  - Permissions and application configuration
- ✓ **Activity Lifecycle and Fragment Lifecycle**
- ✓ **Understanding Context in Android**

UI/UX Design in Android

- ✓ **XML for UI Design**
  - Layouts: Linear, Relative, Constraint, Frame, Grid
  - Views and ViewGroups
- ✓ **Material Design Principles:**
  - Themes, styles, and colors
  - Using Material Components (Buttons, Cards, Chips)
- ✓ **Handling user inputs**
  - EditText, Buttons, Checkboxes, RadioButtons
- ✓ **Advanced UI:**
  - RecyclerView and Adapter
  - Animations and transitions
  - Navigation Component (Fragments, Navigation Graph)

Working with Data

- ✓ **Data Storage:**
  - SharedPreferences for small data
  - Internal and external storage
- ✓ **Database Handling:**
  - SQLite in Android
  - Room Database and its advantages
  - LiveData and ViewModel

- ✓ **Networking and APIs:**
  - REST APIs and JSON parsing (Retrofit, Volley)
  - Authentication and token handling (OAuth)
  - WebSockets for real-time communication

Advanced Android Components

- ✓ **Background Processing:**
  - Services and IntentService
  - WorkManager for background tasks
- ✓ **Broadcasts and Broadcast Receivers:**
  - System and custom broadcasts
- ✓ **Multithreading:**
  - Using AsyncTask, Handlers, and Executors
  - Kotlin Coroutines

Hardware and Sensors

- ✓ **Accessing hardware components:**
  - Camera and Media
  - GPS and location-based services
- ✓ **Sensors in Android:**
  - Accelerometer, Gyroscope, Proximity sensor
- ✓ **Bluetooth and NFC communication**

Firebase Integration

- ✓ Authentication and user management
- ✓ Cloud Firestore and Realtime Database
- ✓ Cloud Messaging (Push Notifications)
- ✓ Firebase Analytics and Crashlytics

Android Jetpack Components

- ✓ **Overview of Jetpack**
  - Lifecycle-aware components
  - ViewModel and LiveData
- ✓ **Navigation Component**
- ✓ **Room Database**
- ✓ **WorkManager**

Kotlin for Android

- ✓ **Basics of Kotlin programming**
  - Syntax and semantics
  - Null safety and type inference
- ✓ **Advanced Kotlin for Android:**
  - Coroutines for asynchronous programming
  - Extension functions and delegates

Testing and Debugging

- ✓ Writing Unit Tests and UI Tests
- ✓ Testing with Espresso and JUnit
- ✓ Debugging techniques and tools
- ✓ Profiling and performance optimization

Publishing and Monetization

- ✓ **Preparing the app for release**
  - Signing APKs
  - App Bundles and Play Store guidelines
- ✓ **App Monetization:**
  - AdMob integration
  - In-app purchases and subscriptions
- ✓ **App analytics and user feedback**

Advanced Topics

- ✓ Dependency Injection (Dagger, Hilt)
- ✓ Modularization of Android apps
- ✓ Building for foldables and tablets
- ✓ Exploring Compose for modern UI development
- ✓ Integrating third-party SDKs (e.g., payment gateways, social logins)