



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR
B.Tech (CSE)- IV-I Sem

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(20A05706) MOBILE APPLICATION DEVELOPMENT
(Skill Oriented course - IV)

Course Objectives:

- Learn the configuration of Android Studio, SDK Manager, and AVD Emulators
- Understand Android UI Components and make use of Material Design for Android
- Learn the usage of Libraries, APIs and handle messages
- Explore various Hybrid App Development Platforms
- Acquire the knowledge of app releases and publishing and app to the play store

Course Outcomes:

After completion of the course, students will be able to

- Demonstrate the configuration of Android Software Development tools
- Design and develop Mobile Applications using Android and Kotlin
- Develop a complex android application by using apis, Libraries, and message handling techniques
- Construct the mobile application using a hybrid framework or SDK
- Release and publish an application on Google Play Store

Activities:

Module 1:

Android OS Architecture: Application Layer, Framework Layer, Libraries and Runtime, Hardware Abstraction Layer, and Kernel

Task: Select any two Mobile Apps used in your mobile phone and note the various functionalities and their corresponding layers

Module 2:

Android Studio: Install Android Studio, SDK Manager, Configure Plugins, Android Virtual Device(AVD) Emulators

Task: Install Android Studio and Configure Latest Android SDKs and Android Virtual Devices

Module 3:

Building your First Application: Understanding Activities and Intents, Activity Lifecycle and Managing State, Activities and Implicit Intents

Task: Build and Run Hello World Application on the virtual Device and also test the app on your mobile phone

Module 4:

Android UI components: Text Controls, Buttons, Widgets, Layouts, Containers

Task: Explore all the UI Controls and design a Student Registration Activity

Module 5:

Material Design for Android: Material theme and widgets, Elevation shadows, Cards, Animations, Drawables

Task: Design the Student Registration Activity using Material Design for Android Components

Module 6:

Navigation: Back-button navigation, Hierarchical navigation patterns, Ancestral navigation (Up button), Descendant navigation, Lateral navigation with tabs and swipes

Task: Design a complete Student Management Application using Android and provide effective navigation between various Activities



Module 7:

Connect to the Internet: Security best practices for network operations, Including permissions in the manifest, Performing network operations on a worker thread, Making an HTTP connection, Parsing the results, Managing the network state

Task: Develop an Android Application that stores Student Details into the hosting server and retrieve student details from the server

Module 8:

Messages and Storage: Creating a Snackbar object, Showing the message to the user, instantiate a Toast object, Show the toast, Add Notification to your App, Customize Notifications, App-specific storage, Preferences, Room persistence library

Task: Secure the Student Management Application with proper hints, messages, notifications, and logging

Module 9:

GeoLocation: Set up the project and get an API Key, Add Markers on the map, map Styles, Enable location tracking

Task: Add your college location on maps and also provide a location tracking feature in your app

Module 10:

Authentication: Add Firebase to the project, Email Authentication, Phone Authentication, Gmail Authentication

Task: Design and implement an effective student Login System with OTP feature and email authentication using firebase

Module 11:

Hybrid App Development: Hybrid App vs Native App, React-Native, Flutter, Ionic, Xamarin

Task: Design Student Management App using any one of the Hybrid Frameworks or SDKs.

Module 12:

Publish App to Play Store: Add a launcher icon and Application ID, Specify API Level targets and version number, Disable logging and debugging, Generate signed APK for release, Create a Google Developer Account, Run pre-launch reports, Review criteria for publishing, Submit your app for publishing.

Task: Prepare and Publish Your Android Apps in Google Play Store

References:

1. Smyth, Neil. Android Studio 4.2 Development Essentials - Kotlin Edition: Developing Android Apps Using Android Studio 4.2, Kotlin, and Android Jetpack, Payload Media, Incorporated, 2021.
2. Cheng, Fu. Build Mobile Apps with Ionic 4 and Firebase: Hybrid Mobile App Development. Germany, Apress, 2018.
3. Derks, Roy, and Boduch, Adam. React and React Native: A Complete Hands-on Guide to Modern Web and Mobile Development with React.js, 3rd Edition. United Kingdom, Packt Publishing, 2020.

Online Learning Resources/Virtual Labs:

<https://developer.android.com/>

<https://material.io/>

<https://kotlinlang.org/>

<https://google-developer-training.github.io/android-developer-fundamentals-course-concepts/>

<https://developers.google.com/>