



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Computer Engineering / Computer Science and Engineering

Subject Code: DI05000141

Subject Name: Mobile Application Development

W.E. F. Academic Year:	2026-27
Semester:	5 th
Category of the Course:	PEC-04

Prerequisite:	The student needs to have basic knowledge of Java programming and basic SQL knowledge.
Rationale:	The Mobile Application Development course is designed to provide diploma students with fundamental knowledge and practical skills required to develop modern mobile applications using the Android platform. The course introduces students to the Android ecosystem, development tools, and application components, followed by user interface design using layouts and views. It covers essential concepts such as event handling, navigation between screens, list handling, and advanced UI features to build interactive applications. Students also learn data storage techniques using local databases and cloud services, integration of web APIs for network communication and the use of device features such as camera, location, and sensors.

Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level
01	Summarize the architecture and key features of Android, and explain its development environment.	Understand
02	Design and implement user interfaces using layouts, views, widgets and event handling mechanisms.	Apply
03	Implement data storage and retrieval using SharedPreferences, Room Persistence Lib and handle REST API using Retrofit lib.	Apply
04	Develop Android applications utilizing advanced features such as sensors, location services, notifications and background tasks, and deploy the application as an APK.	Apply

**Revised Bloom's Taxonomy (RBT)*



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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA / CA (M)	PA/CA (I)	ESE (V)	
0	2	4	3	0	0	20	30	50

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Mobile Application and Development Tools: 1. Introduction to Android : Features, Versions, Architecture. 2. Android Application Development Environment Setup: a. Android Studio Installation b. SDK Manager c. AVD Manager and Emulator 3. Project Structure in Android Studio 4. Creating and running first android application 5. Introduction to Components of Android App: a. Activities b. Services c. Broadcast Receiver d. Content Provider e. Intents f. AndroidManifest.xml : i. Purpose and Structure ii. Application configuration iii. Permissions, Activities and Intent filters	4	10%
2.	User Interface Design and Event Handling 1. Layouts : a. Linear Layout b. Relative Layout c. Constraint Layout d. Frame Layout 2. User Interface Views and Widgets (Elements) :	12	40%



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	a. TextView, EditText, ImageView, Button, CheckBox, RadioButton, Spinner, ListView, DatePicker, TimePicker, 3. Event Handling: Button, TextWatcher, ImageView, Spinner, ListView. 4. Menu: Option Menu, Context Menu, Pop up Menu 5. RecyclerView (RecyclerView Adapter, ViewHolder)		
3.	Data Management, Networking and Deployment 1. Shared Preference 2. Room Persistence Library 3. REST API (Retrofit) & JSON Parsing 4. Firebase: authentication & basic database operation	8	30%
4	Advanced Android Features and App Deployment 1. Notification: Creating, Managing 2. Runtime permissions 3. Sensors and location services 4. Camera access 5. AI Assisted Code generation a. GitHub Copilot b. ChatGPT Codex 6. App Deployment a. APK generation b. App signing c. Google Play Store publishing	6	20%
	Total	30	100%

References/Suggested Learning Resources:

(a) Books:

1. Reto Meier, Ian Lake, “*Professional Android*”, Wiley,
2. J. Thomas, “*Android Development Unleashed: Crafting Engaging Apps with Kotlin and Java*”, Code Academy
3. Dawn Griffiths, David Griffiths, “*Head First Android Development: A Learner’s Guide to Building Android Apps with Kotlin*”, O’Reilly Media
4. Barry Burd, “*Android Application Development All-in-One For Dummies*”, Wiley.



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Suggested Course Practical List:

1. Install Android Studio and run first app

Aim: To install Android Studio IDE and create, build, and run a basic Android application using emulator or real device.

2. Design UI using different layouts

Aim: To design following user interfaces in Android using different layouts such as ConstraintLayout, LinearLayout, RelativeLayout and FrameLayout.

Sign in/Login page, Registration page, Calculator.

3. Event handling with buttons and inputs

Aim: To implement event handling in Android applications using UI elements such as Button and EditText.

Implement Login, Registration and Calculator activity using event handling.

4. Design and implement Event handling of ListView and Spinner

Aim: To design Android applications using ListView, Spinner and implement appropriate event handling for ListView, Spinner.

5. Design options menu, context menu and pop menu for the Activity

Aim: To design Android activity Options Menu, Context Menu and Pop Up Menu for the Activity.

6. RecyclerView list application

Aim: To develop an Android application that displays a list of items using RecyclerView and Adapter.

7. SharedPreferences example

Aim: To navigate between multiple activities and perform store-retrieve operation of simple data in Android using SharedPreferences.

8. Room persistence database CRUD app

Aim: To perform Create, Read, Update, and Delete (CRUD) operations using Room database library in Android.

9. REST API JSON data fetch

Aim: To develop an Android application that fetches and displays data from a REST API using JSON parsing with the help of Retrofit Library.

10. Firebase integration

Aim: To integrate Firebase with an Android application for cloud data storage or authentication.

11. Notification application

Aim: To perform a **background task using WorkManager** and display a notification or message after a delay.

12. GPS location app



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Aim: To develop an Android application that retrieves and displays the device's current location using GPS.

13. Sensor-based application

Aim: To develop an Android application that reads and responds to data from mobile sensors such as the accelerometer.

14. AI Assisted Mobile Application Development

Aim: To study about the Mobile Application Development assistance tools GitHub Copilot and ChatGPT Codex.

15. Generate APK

Aim: To generate and export an APK file from an Android project for application deployment.

List of Laboratory/Learning Resources Required:

1. Computer System Configuration: Desktop or Laptop with minimum specifications:

- Processor: Intel i5/AMD Ryzon 5 (or equivalent) and above
- RAM: 8 GB or more
- Storage: Minimum 256 GB SSD / HDD
- Operating System: Windows 11

2. Software Requirements

- Android Studio IDE (Latest stable version), including JDK and Android SDK
- Android Virtual Device (AVD) Emulator
- Google Chrome / Mozilla Firefox (for API testing and documentation access)
- Postman API Client browser plug in (for testing REST APIs)
- Firebase Console Account (for authentication and database experiments)
- JSON Viewer / Formatter tools (for JSON data analysis)

Suggested Activities for Students:

In addition to tutorial and laboratory sessions, students are encouraged to participate in the following **co-curricular and experiential learning activities**. These activities are designed to strengthen conceptual understanding, promote teamwork, and enhance employability skills related to Mobile Application development.

Recommended Activities

1) Students in group of 4 to 5, may develop a **simple mobile application** such as:

- To-Do List App



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- Student Information App
- Student Attendance App
- Student Feedback App
- Expense Manager
- Unit convertor and Scientific Calculator
- Weather App
- Chat App
- Restaurant Food order App
- Quiz App.

- 2) Encourage student to Enroll the Mooc course for Android Mobile Application Development such as:

Platform: SWAYAM, Offered by: Dr. Babasaheb Ambedkar Open University (BAOU),

Duration: 12 weeks, https://onlinecourses.swayam2.ac.in/e-learning/preview/nou26_ge22