Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Institute of Technology
Semester-5 (B. Tech)

Subject: Advance Mobile Application Development–BETCE15317

Type of course: Professional Core and Professional Elective Courses.

Prerequisite: Basic Knowledge of OOPs and Core Java Language.

Rationale:

With the growing use of smartphones and tablets, mobile application development has emerged as a vital skill, offering access to a large and expanding user base. Android, being an open-source platform, provides a significant advantage and is widely adopted across the industry. This course enables students to develop mobile applications using Android, equipping them with practical, hands-on experience essential for applying programming knowledge in real-world scenarios. As the demand for mobile apps continues to rise, this course helps computer engineering students build core competencies in Android development, bridging the gap between academic learning and industry needs while enhancing their career prospects in a dynamic and evolving technology landscape.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

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Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Applicability to Industrial Projects:** Web services and Parsing, JSON Parsing, Access web data with JSON, Connect to Web Services, Using Async Task & Third-Party Library: Retrofit, Resources and Assets (Colors, Strings, Dimensions, Styles), Basic Event Handling (Click, LongClick, etc.), Simple Form Validation.	06	15%
2	**Work with Android System:** Text to speech, Camera, Taking Picture with Camera, Manage Bluetooth Connection, Monitor and Manage Wi-Fi, Accelerometer Sensor & Gyroscope.	06	15%
3	**Introduction to Kotlin:** Introduction to Kotlin, Setting up Kotlin in Android Studio, Writing a simple Kotlin program (Hello World), Variables and Data Types, Conditional Statements (if, when), Loops (for, while), Functions in Kotlin, String Operations, Null Safety in Kotlin, Scope Functions (let, apply, also), Event Handling using Click Listeners, Kotlin Extensions (KTX), View Binding in Kotlin, Building and Signing APK.	12	25%
4	**Advanced Android Development using Kotlin:** Google Map, Location Service and GPS, Creating Google Map, Work with Location, Location service with Location Manager, Find Current Location, Graphics and Animation, Work with 2D/3D Graphics, Bitmap, Animation, Frame Animation, Tween Animation, View Animation, Multimedia in Android, Play Audio Files, Play Video Files, Introduction to Firebase with CRUD Operations.	12	25%
5	**Development and Deployment:** Delvik Debug Tool, Logcat, Emulator Control, Device Control, Testing Android Applications using Logcat and Breakpoints, Identifying and Fixing Runtime Errors, Work with ADB, Connect Real Devices, Execute Application on Real Device, Generate and Publish Signed APK of the Application.	09	20%

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Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Developing a Feature-Based Android App Using Sensors:** Each student individually builds a basic Android application that integrates at least one physical device sensor such as an accelerometer, gyroscope or light sensor. The app should display live sensor data and include a feature such as detecting shake events or orientation changes. Students must upload screenshots of the running app, the XML Layout and Kotlin source code, along with PDF document briefly explaining sensor usage and output observations on the GMIU web portal.	10
2	**Create a Kotlin App Using Form and JSON API Integration:** Each student individually designs an Android application with a user input form (using EditText, Spinner, Button, etc.) that validates the data and sends a request to any open JSON API (such as a weather or joke API). The response should be parsed and displayed in a user-friendly layout. Upload the code (XML + Kotlin), form validation logic, API request/response screenshot, and a short explanation in PDF format to the GMIU web portal.	10
3	**Create a Chart on the Future of Android Development with AI:** Students will design a chart highlighting key trends, tools, use cases, and future possibilities of Android development integrated with AI. It should include elements like ML Kit, TensorFlow Lite, smart features, and ethical concerns. A summary (200–300 words) explaining the chart and references must be included. Students must upload the chart and summary in PDF or Word format to the GMIU web portal.	10
	Total	30

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	**Remembrance (R)**	**Understanding (U)**	**Application (A)**	**Analyze (N)**	**Evaluate (E)**	**Create (C)**
Weightage %	10%	30%	35%	10%	10%	05%

Course Outcome:

After learning the course the students should be able to:	
CO1	Apply Android application components to build basic apps by accessing web services, using JSON parsing, and implementing form validation techniques.
CO2	Utilize Android system services such as Camera, Bluetooth, Wi-Fi, Text-to-Speech, and sensors to enhance app functionality.
CO3	Develop Android applications using Kotlin programming language with proper use of UI components, event handling, and activity management.
CO4	Implement advanced features like Google Maps, location services, graphics, multimedia, and Firebase to build interactive and data-driven apps.
CO5	Test, debug, and deploy Android applications on real devices using tools like ADB, Logcat, and emulator, and generate signed APKs for production.

List of Practical

Sr. No	Description	Unit No	Hrs.
1	Set up Android development environment, configure AVD, and create a basic Android project.	1	2
2	Create an Android application that fetches and parses JSON data from a public API using Retrofit.	1	2
3	Design an app to access and manage system features like Camera, Wi-Fi, and Bluetooth.	2	2
4	Develop an Android app that displays real-time Accelerometer or Gyroscope sensor data.	2	2
5	Create a simple "Hello World" app using Kotlin and demonstrate Kotlin syntax (variables, conditions, loops).	3	2
6	Build a multi-screen app using Kotlin that passes data between activities via Intent.	3	2
7	Implement event handling in Kotlin (Buttons, EditText, CheckBox, RadioButton) in a user form.	3	4
8	Design an app using Layouts and Widgets (LinearLayout, Spinner, ConstraintLayout, etc.).	3	2
9	Create an app that shows the current location using GPS or Google Maps.	4	2

10	Integrate Firebase Realtime Database to perform basic CRUD operations (add, update, delete).	4	4
11	Test an Android application using Logcat and breakpoints; identify and fix runtime errors.	4	2
12	Generate a signed APK and install the application on a real Android device using ADB.	4	2
13	Create a local SQLite-based application for data insertion, update, and deletion.	5	2
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Android Application Development Black Book, Pradeep Kothari, DreamTech Press.
[2] Beginning Android 4 Application Development, Wei-Meng Lee, Wrox Publication.
[3] Android Wireless Application Development, Lauren Darcey, Shane Conder, Pearson Education.
[4] Android Programming: The Big Nerd Ranch Guide, Bill Phillips, Chris Stewart, Kristin Marsicano, Big Nerd Ranch.
[5] Android Studio Development Essentials – Kotlin Edition, Neil Smyth, Payload Media.