UKA TARSADIA UNIVERSITY

M.C.A. (1st Semester) Syllabus, 2024-2025

Course Code: CS7035 Course Title: Mobile Application Development using Android

Course Credits: [Lecture: 03, Tutorial: 00, Practical: 02]

Prerequisites: Object-Oriented Programming, Web design, and Database Management System

Objectives: Apply knowledge of mobile technologies, activity and fragment life cycles, UI design principles, data management strategies using SQLite and Room, multimedia integration including animations and text-to-speech, and hardware integration techniques for wearables and Android TV, to develop advanced Android applications.

Course Outcomes: Upon completion of the course, students shall be able to

CO1: Understand mobile technologies, platform features, architecture, activity and fragment life cycles, communication, UI design, dialogs and implement foreground and background services for enhanced application functionality.

CO2: Implement broadcast receivers and work with built-in and custom content providers to manage and manipulate data within mobile applications.

CO3: Analyze and use appropriate data storage options such as SQLite databases and the Room persistence library, and implement user alerts using Alarm Manager and notifications.

CO4: Efficiently utilize styles, themes, fonts, animations, movable UI items, menus, action bars, and text-to-speech features to enhance user interaction and visual appeal in Android application development.

CO5: Enhance mobile app functionality by integrating multimedia features like animations, styles, themes, text-to-speech and implementing communication technologies.

CO6: Apply hardware integration techniques for wearables and Android TV, including audio, camera, phone interaction, and fingerprint authentication, to develop sophisticated Android applications.

Course Objective and Course Outcomes Mapping:

- Apply knowledge of mobile technologies, activity and fragment life cycles, UI design principles: CO1, CO2
- Data management strategies using SQLite and Room: CO3 multimedia integration including animations and text-to-speech: CO4
- Hardware integration techniques for wearables and Android TV, to develop advanced Android applications: CO5, CO6

Programme Outcomes: The student will have

PO1: Proficiency in and ability to identify problems related to computer science as well as design and apply computational knowledge to solve them.

PO2: Ability to design, develop, test and maintain system, component, product or process as per needs and specification.

PO3: Understanding of professional and ethical role and responsibility.

PO4: Recognition of the need for and an ability towards life-long learning.

PO5: Knowledge of programming languages, database systems, operating systems, software engineering, Web & Mobile technology and relevant modern issues.

PO6: Ability to demonstrate the use of modern tools, models and languages to solve problems related to software development.

PO7: An ability to communicate and present knowledge effectively.

Programme Outcomes and Course Outcomes mapping:

Course Outcomes	Programme Outcomes						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	✓			✓	✓	✓	✓

CO2	✓	✓		✓	✓	✓	
CO3	✓			✓	✓	✓	
CO4	✓			✓	✓	✓	
CO5	✓			✓	✓	✓	
CO6	✓			✓	✓	✓	

Curriculum Unit Titles

Units	Unit Description	Weightage
1	Activities and Services	
	1.1. Overview of Mobile Technologies, Mobile Platform Features, Architecture, Versions, and Development Tools	[15 %]
	1.2. Activity: Life Cycle, Intent: Communication with Multiple Screen and Built-In Application	
	1.3. Fragment: Introduction, Need, Life Cycle, Creation and Interfragment Communication	
	1.4. User Interface Containers and Screen Elements	
	1.5. Dialogs: Introduction, Need, Types	
	1.6. Service: Overview, Life Cycle, Types	
2	Broadcast Receiver and Content Provider	[15%]
	2.1. Overview of Broadcast Receiver	
	2.2. Sending and Receiving Implicit Broadcasts	
	2.3. Content Provider Framework	
	2.4. Working with Built-in Provider	
	2.5. Working with Custom Content Provider: Registering the Content Provider, Initializing Provider, Querying Data, Modifying Content	
3	Working with Data Storage Mechanisms and User Alerts	[20%]
	3.1. CRUD using SQLite Database	
	3.2. Database: Configuring Environment for Room	
	3.3. Room Architecture, Entities, Relationships and Nested Objects, Data Access	
	3.4. Alarm Manager and Notifications	
4	Working with Multimedia	[15%]
	4.1. Styles and Themes, UI Design with Movable Items	
	4.2. 2D Animation, Property Animation	
	4.3. Recording Audio, Camera: Taking a Picture, Recording a Video	
	4.4. Menus and Action Bars	
5	Mobile Communication Technologies	[15%]
	5.1. Firebase Cloud Messaging	
	5.2. Communication with Backends and Networking Library	
	5.3. Android and NFC	
	5.5. Android and Bluetooth	
6	Application Hardware Components and Deployment	[20%]
	6.1. Wearables Development, Wearables App User Interface, Wearables Faces, Adding Face Complications, Notifications on Wearables	
	6.2. Android TV Use Cases, Android TV Hardware Features, UI Development for Android TV	
	6.3. Interacting with Phone Calls	
	6.4. Interaction with Biometrics: Fingerprint Authentication	
	6.5. Application Deployment	

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcomes					
		CO1	CO2	CO3	CO4	CO5	CO6
1	Activities and Services	✓					
2	Broadcast Receiver and Content Provider		✓				
3	Working with Data Storage Mechanisms and User Alerts			✓			
4	Working with Multimedia				✓		
5	Mobile Communication Technologies					✓	
6	Application Hardware Components and Deployment						✓

Computing Environment:

A student must have the following computing environment in the laboratory and/or on his/her laptop.

- CE#1: Android Studio 3.0 or above

Text Books :

1. Peter Späth ,"Pro Android with Kotlin Developing Modern Mobile Apps", Apress

References :

1. Ted Hagos, "Learn Android Studio 3 with Kotlin - Efficient Android App Development", Apress
2. Wallace Jackson ,"Pro Android Wearables - Building Apps for Smartwatches", Apress