

SYLLABUS

Value Added Course on "Mobile Application Development Using Kotlin"

Duration: 01-06-2026 to 06-06-2026

Participants: III CSE Students

College: KAMARAJ COLLEGE OF ENGINEERING AND TECHNOLOGY, VIRUDHUNAGAR

COURSE OBJECTIVES

- To introduce Kotlin programming fundamentals and set up Android development environment using Android Studio.
- To design and implement Android UI layouts using XML, View Binding, and object-oriented Kotlin concepts.
- To develop multi-screen applications using Activities, Fragments, Navigation Component, and data persistence techniques.
- To build networked, data-driven Android apps using Retrofit, Room Database and Coroutines
- To design and deploy complete Android applications with advanced features such as Maps, Firebase, CameraX, and Play Store publishing.

UNIT 1 : KOTLIN FUNDAMENTALS & ANDROID SETUP

(10 Hours)

Introduction to Kotlin and Android, Android Studio Setup (SDK, Emulator, Gradle), Kotlin Basics: Variables (val/var), Data Types, Type Inference, Control Flow: if-else, when expressions, for/while loops, Functions: Default Parameters, Named Arguments, Single-expression Functions, Null Safety: Nullable Types, Safe Call (?), Elvis Operator (?:), Project Structure: AndroidManifest, Gradle, Project Images added in res folder structure.

UNIT 2 : UI DESIGN WITH XML & KOTLIN OOP

(10 Hours)

XML Layouts: LinearLayout, RelativeLayout, ConstraintLayout, UI Widgets: TextView, EditText, Button, ImageView, CheckBox, RadioButton, View Binding (Replacing findViewById), Kotlin OOP: Classes, Data Classes, Object, Companion Object, Inheritance, Interfaces, Abstract Classes, Lambda Expressions & Higher-Order Functions, Collections: List, Mutable List, Map, Set, Splash Screen & Login/Register UI with Validation

UNIT 3 : ACTIVITIES, FRAGMENTS & NAVIGATION

(10 Hours)

Activity Lifecycle: onCreate, onStart, onResume, onPause, onStop, onDestroy, Intents: Explicit & Implicit, Passing Data between Activities, Fragment Lifecycle & Fragment Manager, Navigation Component: NavGraph, NavController, Safe Args, Bottom Navigation Bar, Tab Layout with ViewPager2, Shared Preferences: Store & Retrieve Login Session, RecyclerView with Adapter & View Holder Pattern

UNIT 4 : NETWORKING, DATA PERSISTENCE

(10 Hours)

Coroutines: launch, async/await, Dispatchers (IO, Main, Default), Retrofit: REST API calls (GET, POST), JSON Parsing with Gson/Moshi, Image Loading: Glide/Coil, Room Database: Entity, DAO, Database Class, Queries, WebView: Load Web Pages inside App, Local Notifications with Notification Manager

UNIT 5 : ADVANCED FEATURES, PROJECT & DEPLOYMENT (10 Hours)

Location Services: FusedLocationProviderClient, Runtime Permissions, Google Maps SDK: Markers and Camera, QR Code Scanner using CameraX: Capture Photos & Preview, Realtime Database/Firestore Basics, Mini Capstone Project: News Reader /

Task Manager App, Debugging: Logcat, Breakpoints, Android Profiler, Generate Signed APK/AAB & Play Store Publishing, Working with GITLab

Total: 50 Hours

COURSE OUTCOMES

After successful completion of the course, the students will be able to

CO. No.	Course Outcome	Knowledge Level
CO1	Build Android applications using Kotlin fundamentals, control flow, and null safety features.	K3 - Apply
CO2	Design and implement interactive UI layouts using XML, View Binding, and Kotlin OOP concepts.	K3 - Apply
CO3	Develop multi-screen Android applications using Activities, Fragments, Navigation Component, and RecyclerView.	K3 - Apply
CO4	Build data-driven Android apps using Retrofit, Room Database, Coroutines, Architecture.	K3 - Apply
CO5	Design and deploy complete Android applications integrating Firebase, Maps, CameraX, and Play Store publishing.	K3 - Apply

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1:

Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2:

Problem - Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

CO - PO MAPPING

Course Name	CO. No.	POs											PSOs	
		1	2	3	4	5	6	7	8	9	10	11	1	2
VAC – Mobile App Dev Using Kotlin	CO1	M	M	M	M	M			L		L	L	M	M
	CO2	M	M	M	M	M			L		L	L	M	M
	CO3	M	M	M	M	M			L		L	L	M	M
	CO4	M	M	M	M	M			L		L	L	M	M
	CO5	M	M	M	M	M			L		L	L	M	M

H - High, M - Moderate, L – Low

SDG MAPPING

VAC Course Name	SDGs																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
				✓				✓	✓								

[Signature]
COO & CTO

Mr. B. Thangamanikandan
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Course coordinators

Dr. V. Rajesh Kannan
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AP- CSE, KCET

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VAC Co-ordinators

Mrs. S. Athilakshmi
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HoD - CSE

Dr. A. Meenakshi
Head & Prof.- CSE
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