

## **Android Programming in Kotlin Course**

We are pleased to provide you with a comprehensive overview of our upcoming 45-hour Android Programming in Kotlin course, which will be expertly conducted by Mr. Eran Katsav, the CEO and founder of Syntax College.

### **About Syntax College (and its CEO, Eran Katsav)**

Syntax College is renowned for delivering a range of courses focused on the Android operating system, catering to private corporations, government organizations, and offering online modules to the general public. Noteworthy clients include organizations such as General Motors™ and Carlson Wagonlit Travel™, who have graciously provided letters of recommendation, which are enclosed for your reference.

It is imperative to highlight that all our courses are personally conducted by Mr. Eran Katsav himself, a distinguished professional holding a B.Sc. degree in Computer Science from the Hebrew University in Jerusalem and a master's degree with honors from Tel Aviv University.

Eran's teaching career spans over 22 years. He currently holds positions at Reichman University (IDC, International School) and the Holon Institute of Technology (HIT). At these institutions, he serves as a lecturer in the Department of Computer Science, specializing in Native Android courses covering Kotlin and Java. More than that, in HIT Eran serves as the head and founder of the mobile lab within the Department of Digital Medical Technologies.

Concurrently, Eran has established himself as an independent developer in the mobile field over the past decade. Among his notable accomplishments is the creation of the first Hebrew voice assistant app, "Bip it," which has been adapted into various white-label versions, including integration into all Suzuki™ vehicles distributed in Israel.

## **Course Overview**

This course is specifically designed for proficient programmers with a background in either the Java or other OOP programming languages, aiming to equip them with the essential technical knowledge requisite for their respective roles. Initially, participants will undergo an in-depth exploration of the Kotlin programming language, spanning both its functional and object-oriented aspects.

Following this independent language immersion, we will delve into the Android development environment, acquainting participants with fundamental user interface concepts. Subsequently, attendees will comprehensively grasp the fundamental building blocks of Android application development. This phase will be marked by continuous and extensive practice of the Kotlin language, underscored by a focused study of the language's unique support libraries. Throughout this process, learners will be engaged in the creation and development of complete projects, with each lesson building upon the previous.

In the subsequent segments of the course, we will delve into the Android Jetpack library, delving deep into the various components comprising its architecture, with a particular emphasis on the MVVM pattern. Attendees will acquire the skills to work with and seamlessly integrate View Model and LiveData and/or Flow in all applications, master the art of data preservation within local databases using Room, and become proficient in crafting Repositories that effectively manage information. All of this will be done with parallel programming through Coroutines.

This course also centers on a unique aspect of the Android system - background operation, devoid of a user interface, and communication with system events via signal reception. Participants will gain a profound understanding of the advantages and limitations of two pivotal components: Service and Broadcast Receivers. Additionally, the course will cover the scheduling of future tasks leveraging the Android operating

system's capabilities, employing tools such as AlarmManager, JobScheduler, and WorkManager.

### **Meeting Details**

The Android Programming in Kotlin course is structured across five sessions. Each session spans 9 hours of in-depth study and is divided into two parts. The first part will be held from 9:00 AM to 12:45 PM, followed by the second part from 1:30 PM to 4:30 PM. Meeting schedules will be thoughtfully coordinated with your organization's needs.

## **Detailed syllabus and a session-by-session breakdown**

### **Lesson 1**

#### **Part 1 - Android Jetpack Overview & Intro to Kotlin**

Intro - AOSP, GMS, Platform Architecture, Native development

AndroidX & Android Jetpack Components

Kotlin overview

Kotlin waltz & vars

Kotlin's Nullability

Kotlin Basics (if, when, loops, Arrays)

#### **Part 2 - Kotlin – Functional Programming**

Functions & Lambdas

Default Arguments

High order Functions

Collections functions (filter, map, flatMap...)

Lazy Sequences

Scope Functions

infix functions

inline functions

extension functions

## **Lesson 2**

### **Part 1 - Object Oriented with Kotlin**

Classes - Constructors and Properties

Inheritance

Interfaces and Abstract classes

Data classes

Delegated properties & lazy initialization

Object expressions and Object Declarations

SAM interfaces

Nested & inner classes

Access modifiers and Generics

Operator Overloading

### **Part 2 - Android Studio & Basic GUI**

Android Studio IDE Project Management

Views and ViewGroups in XML Layout file

Event Handling and Touch events

Resource Localizations

Animations

Dialogs (Alert, Custom Date and Time pickers and Bottom sheet)

## **Lesson 3**

### **Part 1 - Android Building Blocks 1**

Android App Components

Activities & Intents (Explicit and Implicit)

Runtime Permissions using Launchers

Activity LifeCycle and DataStore

## **Part 2 - Android Building Blocks 2**

- Single Activity Architecture with Fragments
- Fragment Lifecycle
- Using Navigation for Fragments transactions
- Recycler View (Adapter, ViewHolder, LayoutManager)

## **Lesson 4**

### **Part 1 - View Models, Live Data and State Flow**

- App Resources & Localization (language, screen, orientation...)
- Configuration changes & savedInstanceState bundle
- MVVM Design pattern
- Jetpack Lifecycle object
- View Model Scope
- State Flow with or without Live Data
- Saved state module
- View Model provider Factory

### **Part 2 - MidProject using Room**

- Internal(sandbox) Database with Room
- Activity For Result with Launchers
- Full MVVM project

## **Lesson 5**

### **Part 1 - Asynchronous programming with Coroutines**

- Making a Responsive UI
- Suspension over Blocking
- CoroutineScope & CoroutineContext
- Dispatchers
- Coroutines Builders (launch, async, withContext...)

Combining Suspended Functions  
Jetpack Components Scopes  
Continuation Object

## **Part 2 - Non UI Related tasks**

Notifications  
Broadcast Receivers  
Static vs Dynamic Registration  
Service and Foreground service  
Background Execution limits  
Job Schedulers  
Work Manager

## **Bonus Topics (not included in 5 days course)**

### **Dependency Injection with Hilt**

The concept of Dependency Injection  
Manual vs Automatic Injection  
Static vs Dynamic injection  
Dagger 2 and Hilt  
Hilt Annotations: @Inject, @Binds and @Provides  
Hilt Modules and @Installin annotation  
Dependencies scope  
View Models with Hilt

### **Testing**

JUnit  
Local vs Instrumented tests  
Mocks with Mockito