

## Developing Android Applications with Kotlin

<b>Faculty Name:</b>	Science
<b>Department:</b>	Computer Science
<b>Lecturer name:</b>	Mr. Eran Katsav
<b>Course Format:</b>	Lecture + Exercises
<b>Teaching mode:</b>	Lecture –3 h. , Exercises / Laboratory - 1 h.
<b>Year of Study:</b>	First degree
<b>Credits points:</b>	3.5
<b>Prerequisite:</b>	Object Oriented Programming 61307

### A. Course Objectives (Specific Objectives / Objectives):

- In-depth acquaintance with Android, the leading OS in the world.
- Deep knowledge in Kotlin programming language with an emphasis on high-order functional programming and object-oriented programming.
- Practical acquaintance with the Coroutines for parallel work.
- Practical acquaintance with the Android application building blocks.
- Working with both local and remote databases.
- Providing the ability to fully communicate with all of the device sensors and features.
- Creating Android operating system tasks and use of its services.
- Structural and thorough planning of the application parts while applying familiar and new design patterns.
- Giving practical ability which will be reflected in the creation of complex projects independently.

### B. Course Rational:

For the past five years, Android, Google's open source project, has become the world's leading operating system. This operating system is the gateway to almost all of the smart devices that surround us and accompany us in all our daily operations. At the same time such institutional training that makes use of the original development environment of Android, is almost non-existent and this is reflected in the existing difficulty in the job market in locating developers with an overall vision of the system. Also, with the increasing complexity of the external environment also increased the complexity and importance of the application architecture, and the importance of pre-planning on its various parts overcame the low and complex work with the user interface, which now comes in pre-built and ready-to-use components for programmers.

The aim of the course is to provide students with an in-depth knowledge and understanding of the Kotlin language, while applying it to the world's leading platform

in order to provide a practical tool for optimal integration into the job market. The course will give students the ability to develop applications that can make almost unlimited use of the capabilities of the mobile device, both at the lowest level in terms of communication with the device hardware and operating system and the highest in terms of using advanced design templates according to the highest industry standards.

### C. A concise description of the course and the teaching method

The course is a practical course in which we will learn while applying the development language for Android and the variety of operating system components available to the developers, so that the theory will be integrated within the practice, each idea will be presented together with its actual application - in code. During the course each student will have to submit an exercises which are basic applications that include research and self-learning of building and designing the user interface and receiving the various events from it, and a final project which is done in pairs or triplets and will be an Android app at market level. It is important to emphasize that because the topic of the user interface is relatively simple but important, a self-study guide will be added to each exercise, and this study will be part of the exercise requirements. The final project will be an app that interacts with a local and remote database, which was built according to the Jetpack architecture and includes most of the Android components learned in class.

### D. Weekly Teaching program by subjects

Week	Subject
1	Android OS Overview & Intro to Kotlin
2	Kotlin – Functional Programming
3	OOP with Kotlin
4	Asynchronous programming with Coroutines
5	Android Building blocks Part 1: Activities, Intents, Permissions, Lifecycle and Persistent storage
6	Android Building blocks Part 2: Fragments & Adapters
7	MVVM (Model View View-Model) and Live Data
8	Local Databases with Room – Jetpack Project
9	Phone Services
10	Dependency Injection with Hilt
11	Full Jetpack Architecture App with Hilt, Room and Retrofit 2
12	The Broadcasting system - Broadcast Receivers and Alarm Service
13	Non-UI Related tasks - Services, Job Services and Work Manager

### E. The final grade will be determined according to the following criteria

- 30% - Two submission exercises during the semester
- 70% - Final project (real world app)

- To pass the course, a passing score must be obtained in the submission exercises and the final project.
- The final project of the course is about 100 hours and done in pairs or threesomes. The goal of the project is to provide students with practical experience in developing applications and accumulating experience in entering the employment market.

#### **F. Bibliography (suggested reading)**

- Kotlin in action (Manning) by Dmitry Jemerov and Svetlana Isakova (19 February 2017)
- Mastering Kotlin: Learn advanced Kotlin programming techniques to build apps for Android, iOS, and the web (Packt Publishing) by Nate Ebel (October 11, 2019)
- How to build Android apps with Kotlin (packt publishing) by Alex Forrester (February 26, 2021)
- Kotlin Coroutines by Tutorials (Second Edition): Mastering Coroutines in Kotlin and Android by ray wenderlich Tutorial Team