EPFL

EE-490(g) | **Lab on app development for tablets and smartphones**

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Cursus	Sem.	Type
Data and Internet of Things minor	H	Opt.
Electrical and Electronical Engineering	MA1, MA3	Opt.
Microtechnics	MA1, MA3	Opt.

Language of teaching	English
Credits	4
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	120h
Weeks	14
Hours	**4 weekly**
Practical work	4 weekly
Number of positions	

It is not allowed to withdraw from this subject after the registration deadline.

Summary

This course focuses on mobile application programming for the Android ecosystem. Students learn to develop distributed Apps on mobile platforms, interfacing with multiple heterogeneous devices and the cloud. Students receive tablets and smartwatches, and can use their own Android devices if desired.

Content

- Introduction to system-level architectures of tablets, smartphones, and smartwatches.
- Introduction to the Kotlin programming language. Basics of Kotlin programming.
- Android overview.
- Setup of Android Development environment.
- Apps User Interface and main building blocks.
- In-app navigation.
- Separation of concerns: UI controllers vs. ViewModels.
- Interacting with Wear devices.
- Interacting other IoT devices via Bluetooth Low Energy.
- Emloying cloud-based features: Firebase.
- Implementing local persistence with Room databases.
- Executing long-running tasks in the background.
- Displaying notifications.

Learning Prerequisites

Recommended courses

- Microprogrammed Embedded Systems (EE-310).
- Lab on Hardware-Software Digital Systems Codesign (EE-390(a)).

Learning Outcomes

- Analyze requirements of Apps to be designed.
- Assess / Evaluate the complexity of an App design.
- Choose the right set of technologies to include in an App.
- Optimize an App design to improve performance across different device capabilities and form factors.
- Implement the required components to design the interface and the behavior of distributed Android Apps.
- Test the final App design.
- Discuss the possible extensions of a developed App.

Transversal skills

- Assess progress against the plan, and adapt the plan as appropriate.
- Plan and carry out activities in a way which makes optimal use of available time and other resources.
- Set objectives and design an action plan to reach those objectives.
- Evaluate one's own performance in the team, receive and respond appropriately to feedback.
- Assess one's own level of skill acquisition, and plan their on-going learning goals.
- Demonstrate a capacity for creativity.
- Access and evaluate appropriate sources of information.
- Make an oral presentation.

Teaching methods

In the first weeks, the course includes a combination of lectures and guided laboratory exercises to understand the baseline technologies and design aspects required in the development of Apps in Android systems.
Then, in the last part of the course, students will develop original projects, selected either from a list proposed by the teacher or of their own design. Students will work in groups under the teacher's supervision, applying the learned concepts.

Expected student activities

Guided exercises in Android-based platforms, interaction in the course, development of a complete and original App project working in a team.

Assessment methods

The evaluation will be based on a mid-term and a 2- or 3-person project done in the last part of the semester.

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes

Resources

Virtual desktop infrastructure (VDI)
No

Bibliography
List of references provided in class, cf. on the Moodle page of the course.
Support material: lecture slides, lab handouts, code snippets, example applications. Solutions to the guided labs will be available through the Moodle page.

Websites

- https://developer.android.com/courses/android-basics-kotlin/course

Moodle Link

- https://go.epfl.ch/EE-490_g