# POZNAN UNIVERSITY OF TECHNOLOGY

## COURSE DESCRIPTION CARD - SYLLABUS

Course name
Advanced Programming of Mobile Terminals [S2Teleinf2>ZPTM]

## Course

| Field of study | Year/Semester |
|---|---|
| Teleinformatics | 1/1 |

| Area of study (specialization) | Profile of study |
|---|---|
| – | general academic |

| Level of study | Course offered in |
|---|---|
| second-cycle | Polish |

| Form of study | Requirements |
|---|---|
| full-time | compulsory |

## Number of hours

| Lecture | Laboratory classes | Other |
|---|---|---|
| 14 | 24 | 14 |

| Tutorials | Projects/seminars |
|---|---|
| 0 | 0 |

## Number of credit points

3,00

## Coordinators

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## Lecturers

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## Prerequisites

The students starting this course should have knowledge of programming (preferably in Kotlin), computer system architecture, and operating systems for mobile devices. They should also possess the ability to implement basic computational algorithms and the skill to gather information from specified sources. The student should also be prepared to collaborate within a team.

## Course objective

The objective of this course is to broaden students' knowledge in the field of mobile terminal programming and enhance their skills in developing applications utilizing modern programming technologies. Additionally, the course aims to demonstrate the utilization of telecommunications aspects of mobile terminal, such as Bluetooth or Wi-Fi Direct.

## Course-related learning outcomes

Knowledge:

1. Has broadened and in-depth knowledge of methods of creating applications for mobile terminals [K2_W01]
2. Understands the methodology of designing complex ICT solutions enabling the use of mobile terminals and created applications
3. Knows modern programming languages and software engineering principles for mobile terminals [K2_W04]
4. Has knowledge of development trends and the most important new achievements in the development of mobile terminals and their operating systems[K2_W07]
5. From the perspective of programming mobile terminals, has advanced and detailed knowledge of the processes occurring in the life cycle of ICT systems, both in the context of hardware or software aspects [K2_W10]

Skills:
1. Can obtain information from literature, databases and other sources, especially the Internet, in order to create software for mobile terminals [K2_U01]
2. Can work individually and in a team to create applications for mobile terminals; can assess the time consumption of a task; is able to lead a small team in a way that ensures the completion of the task on time - preparation of an appropriate application [K2_U02]
3. Can determine directions for further learning and implement the self-learning process in order to create efficient applications for mobile terminals[K2_U11]

Social competences:
1. Is ready to recognize the importance of knowledge in the context of the technological development of mobile terminals and the principles of their programming in solving cognitive and practical problems and to critically evaluate the received content [K2_K01]
2. Poprzez realizację prac indywidualnych i zespołowych, jest gotów do odpowiedzialnego pełnienia różnych ról zawodowych z uwzględnieniem zmieniających się potrzeb; jest gotowy do rozwijania rozwijania dorobku zawodu i do przestrzegania i rozwijania zasad etyki zawodowej oraz działania na rzecz przestrzegania tych zasad [K2_K06]

## Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is assessed through a written exam or an oral examination. The written exam consists of both multiple-choice and open questions, with varying point values. The passing threshold is set at 50% of the total points, indicating a satisfactory level of knowledge.
The oral examination consists of answering 3-5 questions. Each answer is evaluated on a scale of 2 to 5. The final grade for the oral examination is the average of the grades received for individual answers. The examination is considered passed if the average grade is higher or equal to 3.
The skills acquired during the laboratories are assessed based on tasks assigned during the classes, homework assignments, or a project. Each task is evaluated on a scale of 2 to 5. The final grade for the laboratory classes is the average of the grades received for individual tasks.
Grading scale: <50% - 2.0 (ndst); 50% to 59% - 3.0 (dst); 60% to 69% - 3.5 (dst+) ; 70% to 79% - 4.0 (db); 80% to 89% - 4.5 (db+); 90% to 100% - 5.0 (bdb).

## Programme content

1. Architectural patterns in Android applications
2. Communication with REST API
3. Communication between devices
4. Firebase platform
5. Location-based services

## Course topics

Lectures:
1. The concept of LiveData in Android applications and the Model-View-ViewModel (MVVM) pattern.
2. Communication with REST APIs using Retrofit and OkHttp libraries.
3. Utilizing Bluetooth and Wi-Fi Direct technologies in Android applications.
4. Utilizing Firebase Cloud Messaging.

5. Location-based services.
Laboratories:
1. An application demonstrating the use of LiveData and the MVVM pattern.
2. An application demonstrating the use of the Retrofit library for communication with a remote API.
3. An application demonstrating the use of Bluetooth technology.
4. An application demonstrating the use of Wi-Fi Direct technology.
5. An application demonstrating the use of Firebase Cloud Messaging.
6. An application demonstrating the use of location-based services.

## Teaching methods

1. Lecture: Multimedia presentation with discussion. Access to online content.
2. Laboratory exercises: Creating applications relevant to the exercise topic either proposed by the instructor or by yourself.
If necessary, both lectures and laboratory classes can be conducted in a hybrid or online mode.

## Bibliography

Basic:
1. Materiały od prowadzącego
2. https://developer.android.com

Additional:
1. https://cloud.google.com/
2. https://firebase.google.com

## Breakdown of average student's workload

|  | Hours | ECTS |
|---|---|---|
| Total workload | 78 | 3,00 |
| Classes requiring direct contact with the teacher | 38 | 1,50 |
| Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation) | 40 | 1,50 |