Mobile and IoT Application Development

International University of Central Asia
Information Technology Program

1 Course Information

Course Repositories
`https://github.com/iuca/iuca-droid`

Class Discussions
`https://piazza.com/iuca.kg/fall2018/iuca-droid`

Place
TBD

Time
TBD

2 Prerequisites

TBD

3 Contact Information

Instructor
Toksaitov Dmitrii Alexandrovich
toksaitov_d@iuca.kg

Office
TBD

Office Hours
TBD

4 Course Overview

This course introduces students to development tools and APIs to build applications for the Google Android operating system to manage networks of physical devices, vehicles, home appliances, and other items embedded with electronics, sensors, and actuators. Students will get introduced to embedded development on the Arduino

platform with the help of ESP8266, ESP32, and several other WiFi, Bluetooth, and LoRa-enabled chips with programmable microcontrollers. Students will also learn how to build unique interactive user interfaces for multi-touch mobile devices on the Android platform to manage embedded devices around us. The mobile development part covers object-oriented design using the Model-View-Controller paradigm, the Java programming language for the Android Runtime, development frameworks, device emulators, and application build tools. Other topics include multi-threading, power and performance considerations, the accelerated 2-D and 3-D graphics APIs. By bringing two platforms together, students will prototype appliances that can be controlled through mobile phones to help people with their daily life. The course projects range from building a simple smart light bulb to an automatic data collection system with a toy car robot for an indoor positioning system.

5 Topics Covered

- Development tools (Android Studio, SDK, device emulators)
- App. fundamentals (activities, services, content providers)
- User interface elements
- Graphics and animation
- Data storage
- Connectivity
- Media and camera
- Working with device sensors
- Publishing and distributing applications
- Basics of Digital Electronics
- The Arduino IDE
- Working with the ESP8266, ESP-32 boards

6 Practice Tasks

Students are required to finish several practice tasks. The tasks are based on topics discussed during lectures.

7 Course Project

Each student will have to develop an app for the Android platform and a connected device. The challenge of the project is to maintain a certain level of quality for the application to be able to publish it to end users on Google Play Store at the end of the course.

8 Final Exam

At the end of the course, students have to take the final examination to defend their practice works together with the course project.

9 Reading

1. The Big Nerd Ranch Guide by Bill Phillips, Brian Hardy (ISBN: 978-0321804334)
2. Introduction to Java Programming, Comprehensive, 11th Edition by Y. Daniel Liang (ISBN: 978-0132130806)

9.1 Supplemental Reading

1. Introduction to Android Application Development: Android Essentials, 5th Edition by Joseph Annuzzi Jr., Lauren Darcey, Shane Conder (ISBN: 978-0134389455)
2. Design Patterns: Elements of Reusable Object-Oriented Software by Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (ISBN: 978-0201633610)
3. Refactoring: Improving the Design of Existing Code by Martin Fowler, Kent Beck, John Brant, William Opdyke, Don Roberts (ISBN: 978-0201485677)

10 Grading

- Practice tasks (40%)
- Course project (60%)

– 90%–100%: A
– 80%–89%: A-
– 70%–79%: B+
– 65%–69%: B
– 60%–64%: B-
– 56%–59%: C+
– 53%–55%: C

- 50%–52%: C-
- 46%–49%: D+
- 43%–45%: D
- 40%–42%: D-
- Less than 39%: F

11 Rules

Students are required to follow the rules of conduct of the Information Technology Program and International University of Central Asia.

Team work is NOT encouraged. Equal blocks of code or similar structural pieces in separate works will be considered as academic dishonesty and all parties will get zero for the task.