# Universida<sub>de</sub>Vigo

## IDENTIFYING DATA
### Mobile Applications Development

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|---|---|
| Subject | Mobile Applications Development |
| Code | V05M145V01310 |
| Study programme | Telecommunication Engineering |

| Descriptors | ECTS Credits | Choose | Year | Quadmester |
|---|---|---|---|---|
| | 5 | Optional | 2nd | 1st |

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|---|---|
| Teaching language | English |
| Department | |
| Coordinator | Costa Montenegro, Enrique |
| Lecturers | Costa Montenegro, Enrique<br>Gil Castiñeira, Felipe José<br>López Bravo, Cristina |
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| Web | http://faitic.uvigo.es |
| General description | The course "Development of Mobile Applications" shows an overview of the ubiquitous panorama, in particular of the mobile applications and of the different operating systems in which they run.<br><br>Mobile applications market has big growth expectations due to the huge number of active mobile devices around the world (several millions), the deployment of smart cities or the evolution of the Internet to the Internet of Everything (people, processes, data and objects).<br><br>Along the course, an example mobile application (a game) will be developed, through which the different characteristic and functionalities of the Android platform will be introduced: user interfaces, activities, services, context integration, data sharing and security.<br><br>Besides, those who join the course have to develop their own project, which should include all the phases of development of a mobile application, from the initial design to the publication in online software shops such as Google Play.<br><br>The documentation of the course will be available in English. The master sessions, the laboratory practises and the follow-up of the tutored works will be in English, as well. |

## Competencies

| Code | |
|---|---|
| A2 | CB2 Students must apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study. |
| A5 | CB5 Students must have learning skills to allow themselves to continue studying in largely self-directed or autonomous way |
| B8 | CG8 Ability to apply acquired knowledge and to solve problems in new or unfamiliar environments within broader and multidiscipline contexts, being able to integrate knowledge. |
| C33 | CE46/OP16 Ability to understand the current development of mobile and ubiquitous services and market developments . |
| C34 | CE47/OP17 Ability to design, create, integrate sources of context, and working group on the development of a mobile application |

## Learning outcomes

| Expected results from this subject | Training and Learning Results |
|---|---|
| Acquire an overview of the ubiquitous panorama, in particular of the mobile applications and of the different operating systems in which they run. | C33 |

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|---|---|
| Learn how to build mobile applications including different elements (interaction with the user, context integration, interconnection with other devices, notifications, ...) | A2<br>A5<br>B8<br>C34 |
| Work in group to propose, build and defend a mobile application. | A2<br>A5<br>B8<br>C33<br>C34 |

## Contents

| Topic | |
|---|---|
| Movile Operating Systems | - Overview of the leading operating systems for mobile devices (Android, IOS, Windows Phone).<br>- Versions.<br>- Market evolution. |
| Android Operating System | - Android architecture.<br>- Components of an Android application: activities, services, content providers and broadcast receivers.<br>- Applications life cycle. |
| Mobile applications in the market | - Planning the development of an application.<br>- Publication of applications.<br>- Description of mobile applications available in the market. |
| Building Android applications | - Android Studio SDK<br>- Android emulator<br>- Activities, actions and intents<br>- Services and notifications<br>- Menus, preferences and dialogs<br>- User interfaces with views<br>- Fragments<br>- Concurrency<br>- Permissions<br>- Data persistence<br>- Context integration: localization, sensors<br>- Interconnection: bluetooth, wifi |

## Planning

| | Class hours | Hours outside the classroom | Total hours |
|---|---|---|---|
| Lecturing | 4 | 4 | 8 |
| Laboratory practical | 12 | 36 | 48 |
| Mentored work | 4.5 | 49.5 | 54 |
| Presentation | 0.5 | 0.5 | 1 |
| Objective questions exam | 1 | 1 | 2 |
| Laboratory practice | 3 | 9 | 12 |

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

| | Description |
|---|---|
| Lecturing | The professors of the course present the main theoretical contents related to the development of applications for mobile devices. Through this methodology the competency CE33 (CE46/OP16) is developed. |
| Laboratory practical | Students will complete guided and supervised practices about the basic aspects of Android mobile applications. Through this methodology the competencies CB2, CG8, CE33 (CE46/OP16) and CE34(CE7/OP17) are developed. |
| Mentored work | In groups, design, development and test of a mobile application. Students and professors will have regular meetings to check the correct evolution of the tutored works. Through this methodology the competencies CB2, CB5, CG8, CE33 (CE46/OP16) and CE34(CE7/OP17) are developed. |
| Presentation | Presentation and defense of the mobile application that has been developed throughout the course.Through this methodology the competencies CG8, CE33 (CE46/OP16) and CE34(CE7/OP17) are developed. |

## Personalized assistance

| Methodologies | Description |
|---|---|
| | |

| | | |
|---|---|---|
| Lecturing | The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered face-to-face or online (during the master session itself or during the tutoring hours). The tutoring hours will be agreed with the students by appointment. The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. | |
| Laboratory practical | The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered face-to-face or online (during the lab session itself or during the tutoring hours). The tutoring hours will be agreed with the students by appointment. The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. | |
| Mentored work | The professors of the course will provide individual attention to the students during the course, solving their doubts and questions. Questions will be answered face-to-face or online (during the supervising session itself or during the tutoring hours). The tutoring hours will be agreed with the students by appointment. The tutoring sessions may be carried out by telematic means (email, videoconference, FAITIC forums, ...) under the modality of prior agreement. | |
| Presentation | The professors of the course will guide the students during the preparation of the presentation of the results of the guided work, mostly during the last sessions of the supervising sessions or during tutorial sessions. | |

## Assessment

| | Description | Qualification | Training and Learning Results |
|---|---|---|---|
| Mentored work | Whenever possible, the students will be divided in groups, to design, build and test an application for mobile devices. The result will be evaluated after the delivery, taking into account key aspects such as correction, quality, performance and functionalities of the developed application. Likewise, during the development of the project, professors will make a continuous follow-up of the design and the evolution of the implementation, which may include intermediate assessment tests. | 45 | A2 B8 C33 A5 C34 |
| Presentation | At the end of the course, each group of students has to present and defend in English the developed application for mobile devices. The defence has to include a practical demonstration of the use of the application. | 10 | B8 C33 C34 |
| Objective questions exam | After each master session, students will make a multiple choice test (in English) to evaluate the understanding of the presented topics. | 20 | C33 |
| Laboratory practice | In each practice session students will demonstrate the proper functioning of the developments carried out during the session. | 25 | A2 B8 C33 C34 |

## Other comments on the Evaluation

**FIRST CALL**

Following the guidelines of the degree, two evaluation systems will be offered to students attending this course: continuous evaluation and single evaluation. Before the end of the second week of the course, students must declare if they opt for the continuous evaluation or the single evaluation. Those who opt for the continuous evaluation system may not be listed as "not presented" if they make a delivery or an assessment test after the communication of their decision.

**Continuous evaluation system**
Those students who opt for continuous evaluation system must:

- Take a set of tests with multiple choice questions. These partial tests will be done at the end of each master session. These tests will account for 20 % of the overall grade of the course.
- Take a set of practical tests in the laboratory. These tests will be performed at the end of each practice session. These tests will account for 25 % of the overall grade of the course.
- Design, build and defend a mobile application (tutored work). This task will account for 55 % of the overall grade of the course. A 10 % is reserved for the presentation and defence of the developed mobile application. Though this task will be developed in groups (whenever possible), professors will make a continuous follow-up of the activities performed by each student of a group. If the performance of a student is not in line with the rest of his/her teammates, his/her expulsion of the group might be considered, or he or she might be assessed individually.

The final grade of the course will be equal to the weighted arithmetic mean of the three indicated tasks. To pass the course the final grade must be greater or equal to five.

**Single evaluation system**

Those students who opt for the single evaluation system must:

- Take a final test with short answer or multiple choice questions (a 20 % of the overall grade of the course).
- Make and demonstrate the proper functioning of the practices in the laboratory (a 25 % of the overall grade of the course).
- Design, build and defend a mobile application (tutored work), individually or if it is possible in groups (a 55 % of the overall grade of the course, with a 10 % reserved for the presentation and defence of the developed mobile application).
- Deliver a *dossier* that includes all the details about the development of the practices in the laboratory and, especially, about the tutored work.

The final grade of the course will be equal to the weighted arithmetic mean of the three indicated tasks, if the *dossier* is delivered, or zero otherwise. To pass the course the final grade must be greater or equal to five.

**SECOND CALL**
The course final exam will only be held for students who failed the course in the first call.
The assessment will consist in doing one, two or three of the following tasks, depending on the marks achieved in the equivalent tasks during the first opportunity:

- Make a final test with short answers or multiple choice questions (a 20 % of the overall grade of the course).
- Make and demonstrate the proper functioning of the practices in the laboratory (a 25 % of the overall grade of the course).
- Design, build and defend a mobile application (tutored work), individually or if it is possible in groups (a 55 % of the overall grade of the course, with a 10 % reserved for the presentation and defence of the developed mobile application).
- In addition, those who opt for the final assessment system should deliver a *dossier* that includes all the details about the development of the practices in the laboratory and, especially, about the tutored work.

If the mark of any of the tasks in the first opportunity, equivalent to these, is greater or equal to five, the student can choose between keeping his/her marks of the first opportunity or repeating the assessments again.

**OTHER COMMENTS**

- The obtained grades are only valid for the current academic year.
- Although the tutored work will be completed (if possible) in groups, the performance of each student in his or her group will be monitored continuously. In the case in which the performance of a member of the group wouldn't be adequate compared with the performance of his or her team mates, he or she could be excluded from the group and/or qualified individually. This criteria will be also apply to the presententaion of the developd application.
- The use of any material during the tests will have to be explicitly authorized.
- In case of detection of plagiarism in any of the tasks/tests done, the final grade will be "failed (0)" and the professors will communicate the incident to the head of the school to take the measures that they consider appropriate.

| Sources of information |
| --- |
| **Basic Bibliography** |
| Joshua J. Drake, **Android hackers's handbook**, 1ª, |
| Wei-Meng Lee, **Beginning Android 4 Application Develeoment**, 1ª, |
| Jesús Tomás Gironés, **El gran libro de Android**, 5ª, |
| **Complementary Bibliography** |

**Recommendations**

**Other comments**
It is recommended to have Java programming skills

**Contingency plan**

**Description**

Tutoring sessions:

Tutoring sessions may be carried out online: either asynchronously (e-mail, FAITIC forums, etc.) or by videoconference, in this case by appointment.

Elearning platforms/tools

Online tuition will be supported by Campus Remoto and FAITIC. Other supplementary platforms may be used to guarantee the accessibility to teaching content.

Classes and assessment

In the case that the teaching is exclusively non-face-to-face, the classes of the subject and its evaluation will be developed in a similar way, but using the platforms provided by the University.