

1. OVERVIEW

Subject area	Mobile Development
Degree	Bachelor's Degree in Computer Engineering
School/Faculty	School of Architecture, Engineering and Design
Year	3
ECTS	4
Type	Elective
Language(s)	Spanish
Delivery mode	On campus
Semester	S5
Year	2022-2023
Coordinating professor	Carlos Iglesias Álvarez

2. INTRODUCTION

Mobile Development is an elective subject area, worth 6 ECTS credits, within the Programming subject, which is formed by 42 ECTS credits, 6 of which are elective. This subject area aims to teach students the concepts and basic guidelines to develop mobile applications, starting with an understanding of their particularities and the different approaches available to carry them out.

The Computer Engineering student will build on the knowledge acquired in previous subject areas on interface design techniques, software engineering and programming languages. Mobile devices, whether smartphones or other wearable devices, offer unique features compared to other platforms, both because they are equipped with more and more sensors (GPS, camera, accelerometers, heart rate monitor, etc.) and they are conditioned by graphical interfaces and forms of use that are very different from other development platforms.

The student will learn how to design mobile applications that take these particularities into account and, in particular, what development environments or tools are available to do this: from the adaptation of well-known web development platforms to native development environments for the two dominant operating systems: Android and iOS.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
- CB5: Students have developed the learning skills necessary to undertake further study in a much more independent manner.

Transversal skills (CT, by the acronym in Spanish):

- CT11: Planning and time management: Ability to set objectives and choose the right means to fulfil them through efficient use of time and resources.
- CT16: Decision-making: Ability to choose between different options or methods to effectively solve varied situations or problems.
- CT17: Teamwork: Ability to integrate and collaborate actively with other people, departments and/or organisations in order to reach common goals.

Specific skills (CE, by the acronym in Spanish):

- CE13 Knowledge, design and efficient use of the most appropriate data types and structures to solve a problem.
- CE27 Ability to assess the computational complexity of a problem, know algorithmic strategies that help to solve it, and recommend, develop and implement the strategy that guarantees the best performance according to the established requirements.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: Know the particularities of applications intended for mobile devices.
- RA2: Recognise the features and abilities of native applications in comparison to hybrid or web-based applications.
- RA3: Prototyping mobile applications.
- RA4: Use the environments and tools to develop mobile applications.
- RA5: Design and program (native) mobile applications.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB5, CE13	RA1: Know the particularities of applications intended for mobile devices.
CB5, CE27	RA2: Recognise the features and abilities of native applications in comparison to hybrid or web-based applications.
CG8, CT11, CT16, CE13	RA3: Prototyping mobile applications.
CG8, CE27	RA4: Use the environments and tools to develop mobile applications.
CB4, CT16, CT17, CE13	RA5: Design and program (native) mobile applications.

4. CONTENTS

- Mobile application features. Introduction to the design and development of mobile devices.
- Multiplatform application development.
- Development tools.
- Resources and services.
- Native development: Android and Swift in iOS.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- **Survey on aims and interests.** This survey is used to establish the aims of the subject and gather the student's interests on the subject. We will then make reference to it throughout the year for the students to evaluate the achievement of the aims and interests. In the online delivery mode, an initial questionnaire is carried out with the same objective.
- **Lectures, subjects of study and seminars.** The "lectures" taught in the on-campus delivery mode are called subjects of study and seminars in the online delivery mode, and are conducted through readings on the topic, technical notes and webinars (which are recorded for students to access).

- **Laboratory work.** In the on-campus delivery mode, the campus laboratories will mainly be used, while in the online delivery mode, the remote desktop infrastructure will be used.
- **Group research and/or problem-solving.**
- **Designs, understood as practical proposals for solving specific problems.** They will be used in all delivery modes and help to develop creative potential and technical skills in the field of engineering.
- **Fieldwork, conferences, visits to companies and institutions.** These will be used for the development of conditional knowledge. In the on-campus delivery mode, all learning methods may be used, while only conferences can be used in the online delivery mode, as they will be available for remote access in real time (via streaming technologies) or recorded and broadcast afterwards.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity (AF, by the acronym in Spanish)	Number of hours
Lectures, reading on main topics and complementary materials, implementation of activities carried out independently and collectively (including participation in collaborative learning forums)	50 h
Integrative group work	25 h
Independent working	50 h
Tutorials, academic monitoring and assessment	25 h
TOTAL	150 h

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
Exams and tests	30%
Development of articles, reports or design briefs	30%
Alternative assessment methods with mind maps, diaries, debates, portfolios, peer assessment	25%
Assessment of the basic and general skills	15%

On the Campus Virtual, when you open the subject area, you will find all the details of your assessable tasks and the deadlines and assessment procedures for each task.

7.1. Ordinary exam period

To pass the subject area in the ordinary exam period, you will need a final grade of at least 5.0 out of 10.0 (weighted average) for the subject area.

In any case, you will need a grade of at least 4.0 in the final test for it to be included in the weighting with the other activities.

7.2. Extraordinary exam period (resits)

To pass the subject area in the ordinary exam period, you will need a final grade of at least 5.0 out of 10.0 (weighted average) for the subject area.

In any case, you will need a grade of at least 4.0 in the final test for it to be included in the weighting with the other activities.

Activities not passed in the ordinary exam period, or those not submitted, must be submitted after receiving the relevant corrections and feedback from the lecturer.

8. TIMELINE

The timeline with submission dates for the assessable tasks in this subject area will be indicated in this section:

Assessable tasks	Date
Diagnostic test	Weeks 0–1
Design your mobile application	Weeks 0–3
Hybrid application development	Weeks 4–6
Android app development	Weeks 7–11
Swift iOS app development	Weeks 12–15
Project Presentation	Weeks 16–18
Final integrative test	Week 19

The timeline may be subject to change for logistical reasons related to the activities. Students will be informed of any changes in due time and course.

9. BIBLIOGRAPHY

The reference material for the subject area is as follows:

John F. Clark. History of Mobile Applications.

Theory and Practice of Mobile Applications - Readings and Lectures -2012

Benjamin Bahr. Prototyping of User Interfaces for Mobile Applications. Springer. 2017

Javier Cuello y José Vitone. Diseñando apps para móviles. Junio de 2013. www.appdesignbook.com

Jenifer Tidwell, Charles Brewer y Aynne Valencia.

Designing Interfaces: Patterns for Effective Interaction Design. O'Reilly 2020

Flutter documentation. <https://flutter.dev/docs> Tutorial de Flutter: aprende a desarrollar aplicaciones con el SDK de Google <https://www.ionos.es/digitalguide/paginas-web/desarrollo-web/tutorial-de-flutter/>

Angela Yu. Introduction to Flutter Development Using Dart. The App Brewery. <https://www.appbrewery.co/p/intro-to-flutter>

Android Tutorial. <https://w3points.com/android-tutorial/> Pérez, B.P. y Lee, W.M. (2012).

Android 4. Desarrollo de aplicaciones. Anaya Multimedia-Anaya Interactiva.

Firestore Cloud Messaging. <https://firebase.google.com/docs/cloud-messaging>

Cómo controlar la cámara <https://developer.android.com/training/camera/cameradirect?hl=es-419>

Apple Developer. <https://developer.apple.com/>

XCode SwiftUI. <https://developer.apple.com/xcode/swiftui/>

Swift. <https://developer.apple.com/swift/>

Swift.org. <https://swift.org/>

Mastering SwiftUI Book. <https://blckbirds.com/mastering-swiftui-book/>

10. DIVERSITY AWARENESS UNIT

Students with special educational needs:

To ensure equal opportunities, curricular adaptations or adjustments for students with special educational needs will be outlined by the Diversity Awareness Unit (UAD, Spanish acronym).

As an essential requirement, students with special educational needs must obtain a report about the curricular adaptations/adjustments from the Diversity Awareness Unit by contacting unidad.diversidad@universidadeuropea.es at the beginning of each semester.

11. STUDENT SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degrees and the learning process.

These surveys will be available in the survey area of your campus virtual or by email.

Your opinion is essential to improve the quality of the degree.

Many thanks for taking part.