ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000868 - Mobile Applications Development

DEGREE PROGRAMME

10AZ - Master Universitario En Innovación Digital

ACADEMIC YEAR & SEMESTER

2025/26 - Semester 1

Index

Learning guide

1. Description

1.1. Subject details

Name of the subject	103000868 - Mobile Applications Development
No of credits	4.5 ECTS
Type	Optional/elective
Academic year ot the programme	Second year
Semester of tuition	Semester 3
Tuition period	September-January
Tuition languages	English
Degree programme	10AZ - Master Universitario en Innovación Digital
Centre	10 - E.T.S. De Ingenieros Informáticos
Academic year	2025-26

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Sergio Paraiso Medina	2306	sergio.paraiso@upm.es	Sin horario.
Raul Alonso Calvo (Subject coordinator)	2315	raul.alonso@upm.es	M - 10:00 - 13:00 W - 10:00 - 13:00

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- Programming skills, and object-oriented programming

- Elementary knowledge of web programming and web services

4. Skills and learning outcomes *

4.1. Skills to be learned

CB06 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación

CB10 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo.

CE-CD09 - Capacidad para explorar formas de utilizar nuevas herramientas y técnicas de ciencia de datos con una mentalidad empresarial para enfrentar los desafíos empresariales y organizativos con una mentalidad empresarial

4.2. Learning outcomes

RA26 - Evaluate and implement systems that use accessibility APIs

RA30 - Understand the particularities of user-centered design in mobile platforms and ubiquitous computing

RA21 - Implement basic interactive android applications

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

This course introduces the fundamentals of programming techniques for mobile devices, more concretely to android basics development. Students will learn how to design and implement mobile applications following user interfaces design good practices, and how user interface systems are integrated with mobile operating system.

The course will focus on prototyping and development of simple graphical user interfaces (GUI) using rapid development tools such as graphical user interface layout editors combined with simple code to create functioning interfaces.

The course focuses on practice the skills needed for development of user interfaces to be deployed on Android mobile platform.

Concretely, students will learn to use technologies from mobile applications:

- Basics on GUI, such as event-driven programming, or design patterns, like Model-View-Controller (MVC).

- Basics on client-server communications and web communications.

- Android framework and development, including system interaction, application states, layout generation, basic UI components using Java.

5.2. Syllabus

1. Introduction to Android platform
2. Android Acivity lifecicle
3. Android Intents
4. Android UI layouts and components
   4.1. Layout basic design
   4.2. Developing UI in Android
5. Services
6. Introduction to data persistence features in Android
   6.1. Application preferences
   6.2. File system
   6.3. Content providers
7. Accessing web services using JSON
8. Broadcast receivers

6. Schedule

6.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	**Introduction to Android platform** Duration: 02:00 Lecture			
2	**Android project tools and project structure** Duration: 01:00 Lecture **Android project tools and project structure** Duration: 01:00 Laboratory assignments			
3	**Activity** Duration: 01:00 Lecture **Activity** Duration: 01:00 Laboratory assignments			
4	**Intents** Duration: 01:00 Lecture **Intents** Duration: 01:00 Laboratory assignments			
5	**Data exchange in activities** Duration: 01:00 Lecture **Data exchange in activities** Duration: 01:00 Laboratory assignments			
6	**Basic UI components** Duration: 00:30 Lecture **Basic UI components** Duration: 01:30 Laboratory assignments			
7	**Services** Duration: 00:30 Lecture **Services** Duration: 01:30 Laboratory assignments			

8	**Prototype design** Duration: 02:00 Laboratory assignments			
9	**Broadcast receivers** Duration: 00:30 Lecture **Broadcast receivers** Duration: 01:30 Laboratory assignments			
10	**Persistence** Duration: 00:30 Lecture **Persistence** Duration: 01:30 Laboratory assignments			**Daily work assignment** Group work Progressive assessment Not Presential Duration: 04:00
11	**Persistence** Duration: 02:00 Laboratory assignments			
12	**Accessing web services** Duration: 01:00 Lecture **Accessing web services** Duration: 01:00 Laboratory assignments			
13	**Prototype implementation** Duration: 02:00 Laboratory assignments			
14	**Prototype implementation** Duration: 02:00 Laboratory assignments			
15	**Prototype implementation** Duration: 02:00 Laboratory assignments			
16	**Application prototype** Duration: 03:00 Additional activities			**Application prototype** Group work Progressive assessment Presential Duration: 03:00 **Application prototype** Group work Global examination Presential Duration: 03:00
17	**Pupil portfolio presentation** Duration: 03:00 Additional activities			**Pupil portfolio presentation** Group presentation Progressive assessment Presential Duration: 03:00 **Pupil portfolio presentation** Group presentation Global examination Presential Duration: 03:00

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27

hours of student face-to-face contact and independent study time.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
10	Daily work assignment	Group work	No Presential	04:00	10%	3 / 10	CB06 CB10 CE-CD09
16	Application prototype	Group work	Face-to-face	03:00	70%	5 / 10	CB06 CB10 CE-CD09
17	Pupil portfolio presentation	Group presentation	Face-to-face	03:00	20%	5 / 10	CB06 CE-CD09

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
16	Application prototype	Group work	Face-to-face	03:00	80%	5 / 10	CB06 CB10 CE-CD09
17	Pupil portfolio presentation	Group presentation	Face-to-face	03:00	20%	5 / 10	CB06 CE-CD09

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Application prototype	Group work	Face-to-face	12:00	90%	5 / 10	CB06 CB10 CE-CD09
Pupil portfolio presentation	Group presentation	Face-to-face	02:00	10%	5 / 10	CB06 CE-CD09

7.2. Assessment criteria

This course is intended to be practical. iIt is encouraged that pupils bring their own laptop to follow laboratory classes.

In this subject a progressive evaluation is carried out, the 'Daily work assignment', with a weight of 10% of the subject will not be recoverable in the global evaluation, since it evaluates the daily work of the students. This test will be done in class and in a maximum of two deliveries. It is not recoverable in the ordinary call, nor in the extraordinary since it is used as a control and consolidation mechanism of knowledge acquired by stidents and as a tool to re-adapt teaching based on its results.

All presentations and documents required in assignments should be written in English, as well as pupil's presentations.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Android Developers	Web resource	https://developer.android.com/
Android Studio	Others	Software
Android SDK	Others	Software
The Busy Coder's Guide to Android Development by Mark Murphy	Bibliography	https://commonsware.com/Android/Android_3-3-CC.pdf
Web resources	Others	http://developer.android.com http://stackoverflow.com/questions/tagged/android https://groups.google.com/group/android-developers

9. Other information

9.1. Other information about the subject

This course is not going to be taught the academic year 2025/2026

For attending this course, it is recommended that pupils bring a laptop with Android Studio software installed.

Para el correcto seguimiento del curso se recomienda que los estudiantes asistan a clase con su ordenador portátil con el software de desarrollo necesario instalado.

El objetivo de esta asignatura es enseñar a diseñar e implementar aplicaciones móviles usando Java.

El desarrollo de la tecnología móvil ha influido en diversas áreas de nuestra sociedad, potenciando desde procesos educativos hasta procesos industriales. Por resaltar algunos de los objetivos de desarrollo sostenible que están más relacionados con la presente asignatura podemos nombrar los Objetivos de Desarrollo:

Objetivo 3: Garantizar una vida sana y promover el bienestar para todos en todas las edades

Objetivo 4: Garantizar una educación inclusiva, equitativa y de calidad y promover oportunidades de aprendizaje durante toda la vida para todos

Objetivo 9: Construir infraestructuras resilientes, promover la industrialización sostenible y fomentar la innovación

Objetivo 11: Lograr que las ciudades sean más inclusivas, seguras, resilientes y sostenible

Y por supuesto el Objetivo 8 Trabajo decente y crecimiento económico - Promover el crecimiento económico inclusivo y sostenible, el empleo y el trabajo decente para todos ya que en la actualidad muchos los puestos de trabajo en el área IT requieren conocimientos sobre esta materia.

NOTA 1: Lo recogido en esta guía se aplicará si y sólo si la asignatura dispone de los medios humanos y materiales necesarios para poder aplicar lo aquí dispuesto. En caso de no disponer de medios necesarios se adecuará tanto la docencia como la forma de evaluar a los/las estudiantes a los medios disponibles.

NOTA 2: Los horarios de tutoría se pueden ver modificados a lo largo del curso. Se ruega pedir siempre cita previa.

NOTA 3: El temario de la asignatura puede ser modificado para adaptarse a las necesidades reales de los alumnos y su adaptación a la titulación.

NOTA 4: Se podrá modificar y readaptar el cronograma, así como las fechas de las actividades de evaluación recogidas en esta guía, con el fin de afianzar y consolidar los conocimientos adquiridos por los alumnos que cursan esta asignatura.

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Several innovative teaching methodologies are implemented in this course (https://innovacioneducativa.upm.es/guias-pdi) with the aim of motivating and enhancing student learning:

Methodology 1: Learn by Doing ? Students learn by programming from day one, through practical exercises and specific challenges. Each technical concept is briefly introduced and immediately applied through code. Android Studio is used to develop and test real applications.

Methodology 2: Project-Based Learning (PBL) ? Students work in teams to develop a complete mobile app over the course of the semester. The project progresses through several phases: design, development, integration, and testing. This methodology fosters autonomy, collaboration, and real-world application of knowledge.