



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
EXCELLENCE

COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros
Informaticos

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

105000396 - Programming For Mobile Devices

DEGREE PROGRAMME

10II - Grado En Ingenieria Informatica

ACADEMIC YEAR & SEMESTER

2019/20 - Semester 2

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Learning guide

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1. Description

1.1. Subject details

| | |
|---------------------------------------|--|
| Name of the subject | 105000396 - Programming For Mobile Devices |
| No of credits | 3 ECTS |
| Type | Optional |
| Academic year of the programme | Fourth year |
| Semester of tuition | Semester 8 |
| Tuition period | February-June |
| Tuition languages | English |
| Degree programme | 10II - Grado En Ingenieria Informatica |
| Centre | 10 - Escuela Tecnica Superior de Ingenieros Informaticos |
| Academic year | 2019-20 |

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 |
| Cristian Moral Martos | 5110 | cristian.moral@upm.es | M - 12:00 - 15:00 W - 09:00 - 12:00 |

* 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

- Algoritmos Y Estructura De Datos
- Programacion li
- Concurrencia
- Sistemas Orientados A Servicios

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

CG-19 - Capacidad de usar las tecnologías de la información y la comunicación.

CG-2/CE45 - Capacidad para el aprendizaje autónomo y la actualización de conocimientos, y reconocimiento de su necesidad en el área de la informática.

CG-24/25/26/27 - Capacidad para trabajar en el contexto internacional, comunicándose en lengua inglesa y adaptándose a un nuevo entorno.

CG-6 - Capacidad de abstracción, análisis y síntesis

Ce 44 - Conocimiento de tecnologías punteras relevantes y su aplicación.

4.2. Learning outcomes

RA523 - Get familiar with techniques, technologies and processes allowing them to prototype, develop and improve digital interactive systems based on various user interface technology platforms

RA280 - Obtención de las competencias lingüísticas comunicativas (comprensión, expresión, etc.) habladas y escritas en entornos académicos/profesionales nacionales/internacionales.

RA276 - Dado un campo de aplicación de la informática, evaluar y diseñar el sistema informático más apropiado para resolver alguno de sus problemas, exponiendo las dificultades técnicas y los límites de la aplicación.

RA524 - Implement interactive android applications

RA285 - Capacitación para formar parte de un equipo de trabajo en los diferentes cargos que se le asignen. Para la Movilidad Internacional:

* 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, ?.

5.2. Syllabus

1. Introduction to Android platform
2. Mobile UI design
 - 2.1. Introduction to UI design
 - 2.2. Good practices and mobile UI prototyping
3. Introduction to principles in software design and development processes
 - 3.1. Principles of object oriented programming and design techniques for GUI
 - 3.2. Interaction programming and event driven programming
4. Introduction to Android architecture
 - 4.1. Android development tools
 - 4.2. Intents and Activities
 - 4.3. Android UI layouts and components
 - 4.4. Developing UI in Android
 - 4.5. Notifications
 - 4.6. Broadcast receivers
5. Introduction to data persistence features in Android
 - 5.1. Application preferences
 - 5.2. File system

5.3. SQLite

6. Schedule

6.1. Subject schedule*

| Week | Face-to-face classroom activities | Face-to-face laboratory activities | Other face-to-face activities | Assessment activities |
|------|---|--|-------------------------------|---|
| 1 | Introduction to Android platform Duration: 02:00 Lecture | | | |
| 2 | Introduction to UI design Duration: 01:00 Lecture | Introduction to UI design Duration: 01:00 Laboratory assignments | | |
| 3 | Good practices and mobile UI prototyping Duration: 01:00 Lecture | Good practices and mobile UI prototyping Duration: 01:00 Laboratory assignments | | |
| 4 | Principles of object oriented programming and design techniques for GUI Duration: 01:00 Lecture Interaction programming and event driven programming Duration: 01:00 Lecture | | | |
| 5 | Android development tools Duration: 00:30 Lecture | Android development tools Duration: 01:30 Laboratory assignments | | |
| 6 | Intents and Activities Duration: 00:30 Lecture | Intents and Activities Duration: 01:30 Laboratory assignments | | |
| 7 | Android UI layouts and components Duration: 00:30 Lecture | Android UI layouts and components Duration: 01:30 Laboratory assignments | | |
| 8 | Android UI layouts and components Duration: 00:30 Lecture | Android UI layouts and components Duration: 01:30 Laboratory assignments | | |
| 9 | Intents and Activities Duration: 00:30 Lecture | Intents and Activities Duration: 01:30 Laboratory assignments | | |
| 10 | Developing UI in Android Duration: 00:30 Lecture | Developing UI in Android Duration: 01:30 Laboratory assignments | | Mobile UI design Group work Continuous assessment Duration: 08:00 |
| 11 | Notifications & broadcast receivers Duration: 01:00 Lecture | Notifications & broadcast receivers Duration: 01:00 Laboratory assignments | | |

| | | | | |
|----|--|---|--|--|
| 12 | Application preferences Duration: 01:00 Lecture | Application preferences Duration: 01:00 Laboratory assignments | | |
| 13 | Android File System Duration: 01:00 Lecture | Android File System Duration: 01:00 Laboratory assignments | | |
| 14 | SQLite Duration: 00:30 Laboratory assignments Content Providers Duration: 00:30 Lecture | SQLite Duration: 00:30 Laboratory assignments Content Providers Duration: 00:30 Laboratory assignments | | Application prototype Group work Continuous assessment and final examination Duration: 10:00 |
| 15 | | | | Theoretical exam Problem-solving test Continuous assessment Duration: 02:00 |
| 16 | | | | Theoretical exam Written test Final examination Duration: 02:00 |
| 17 | | | | |

The independent study hours are training activities during which students should spend time on individual study or individual assignments.

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.

* The subject schedule is based on a previous theoretical planning of the subject plan and might go through experience some unexpected changes along throughout the academic year.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Continuous assessment

| Week | Description | Modality | Type | Duration | Weight | Minimum grade | Evaluated skills |
|------|-----------------------|----------------------|---------------|----------|--------|---------------|---|
| 10 | Mobile UI design | Group work | No Presential | 08:00 | 10% | 5 / 10 | CG-19 CG-24/25/26/27 |
| 14 | Application prototype | Group work | No Presential | 10:00 | 50% | 5 / 10 | CG-2/CE45 CG-6 CG-19 CG-24/25/26/27 Ce 44 |
| 15 | Theoretical exam | Problem-solving test | Face-to-face | 02:00 | 40% | 5 / 10 | CG-2/CE45 CG-6 CG-19 CG-24/25/26/27 Ce 44 |

7.1.2. Final examination

| Week | Description | Modality | Type | Duration | Weight | Minimum grade | Evaluated skills |
|------|-----------------------|--------------|---------------|----------|--------|---------------|---|
| 14 | Application prototype | Group work | No Presential | 10:00 | 50% | 5 / 10 | CG-2/CE45 CG-6 CG-19 CG-24/25/26/27 Ce 44 |
| 16 | Theoretical exam | Written test | Face-to-face | 02:00 | 50% | 5 / 10 | CG-6 CG-19 CG-24/25/26/27 Ce 44 CG-2/CE45 |

7.1.3. Referred (re-sit) examination

| Description | Modality | Type | Duration | Weight | Minimum grade | Evaluated skills |
|-----------------------|--------------|--------------|----------|--------|---------------|---|
| Application prototype | Group work | Face-to-face | 18:00 | 60% | 5 / 10 | CG-2/CE45 CG-6 CG-19 CG-24/25/26/27 Ce 44 |
| Theoretical exam | Written test | Face-to-face | 02:00 | 40% | 5 / 10 | CG-2/CE45 CG-6 CG-19 CG-24/25/26/27 Ce 44 |

7.2. Assessment criteria

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

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

Class attendance is strongly recommended.

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 |

9. Other information

9.1. Other information about the subject

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