



## Teaching Guide

Identifying Data				2017/18
Subject (*)	Systems Programming	Code	614G01058	
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Obligatoria	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría de Computadores			
Coordinador	Vazquez Regueiro, Carlos	E-mail	carlos.vazquez.regueiro@udc.es	
Lecturers	Vazquez Regueiro, Carlos	E-mail	carlos.vazquez.regueiro@udc.es	
Web				
General description	Programming embedded systems and mobile devices			

## Study programme competences / results

Code	Study programme competences / results
A32	Capacidade de desenvolver procesadores específicos e sistemas embarcados, así como desenvolver e optimizar o software dos ditos sistemas.
A34	Capacidade de deseñar e implementar software de sistemas e de comunicacións.
B1	Capacidade de resolución de problemas
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben afrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

## Learning outcomes

Learning outcomes	Study programme competences / results		
Ability to develop Android applications in mobile devices, specific processors and embedded systems	A32 A34	B1	C6 C7 C8
Ability to develop Android applications with capacity of communications and interaction	A32 A34	B1	C6 C7 C8

## Contents

Topic	Sub-topic
1.1. Introduction to Systems Program	Introduction to Systems Program Subject presentation
1.2. Introduction to Android	History and evolution Architecture and characteristics Main components
1.3. Development tools	SDK and Android Studio instalation Basic application and application structure Debugging and testing Android in other devices Application's Resources



1.4 Distribution	Publication Security Monetization and Publicity Optimization
2.1. Activities and Intents	Cycle of life Manifest Intents, explicit and implicit Parameters exchange
2.2. User interface	Layouts Views Events
2.3. Fragments	Concept Fragments statics and dynamics Fragments communication
2.4. Working in background	Local Services Bound Services Broadcast Receivers Processes and Threads Asynchronous threads
3.1. Interacting with user	Menu and Action Bar Contextual menu Notifications Dialogs Lists and Adapters
3.2. Data persistence	Preferences Files internal and external Data bases Content Providers Loaders
3.3. Interconnection	Sockets Connection by Post Protocols: XML y JSON Advanced network services
3.4. AppWidgets and Background services	AppWidgets Background services
4.1. System services and Sensors	System services Connectivity Wifi and Phone Services Sensors
4.2. Localization and Maps	Localization Maps (Google Maps library) Localization Services
4.3. Multimedia and Camera	Multimedia reproduction Audio Manager Camera
4.4. Animations and Graphics	Animations Graphics Multiple events



Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Laboratory practice	A32 A34 B1 C6 C7	14	42	56
Supervised projects	A32 A34 B1 C6 C7 C8	7	35	42
Mixed objective/subjective test	A32 A34 B1 C6	3	0	3
Guest lecture / keynote speech	A32 A34	20	25	45
Personalized attention		4	0	4

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

Methodologies	
Methodologies	Description
Laboratory practice	<p>Students will develop practices in the laboratory for learning programming mobile devices with Android. A series of practices following a script to familiarize the student with the concepts and the basic procedures of Android programming will be raised (competencies A32 and A34).</p> <p>It will also promote the expansion and improvement of the basic features of each proposed practice (competency C7) as well as the discussion and resolution of problems (competencies B1 and C6).</p> <p>Practices consist of a face-to-face part (which is delivered to the end) and other non-Presential delivered before the next class of laboratory.</p> <p>Part-time students could present all the practices of non Presential form.</p>
Supervised projects	<p>Works (applications) will be proposed to make students deepen in topics covered by the course (competences A32 and C34) and explore new knowledge (competencies C6 and C7). It will be valued especially that the application is functional and robust (competency B1) and is valuable for society (competency C8).</p> <p>Each work will be developed by a small number of students (typically between 2 and 4), so that group coordination and working methodology is very important. A small report of follow-up in the most important phases of development will also be required.</p> <p>Ideas and problems will be discussed primarily during the hours tutoring in small groups.</p>
Mixed objective/subjective test	<p>Examination of the contents of the subject that will combine theory with problem solving questions.</p> <p>This type of tests will be used to check competencies A32 and A34.</p>
Guest lecture / keynote speech	<p>Didactic exhibition of the theoretical content of the subject using slides and other ICT resources.</p> <p>Also, certain basic application will be explain in detail so that students can implement them and tested during laboratory practices.</p> <p>The lectures are oriented both to acquire the necessary knowledges (A32 and A34) as to guide the students to autonomously search and acquire new knowledge (competency C7). Moreover, the lectures are used to encourage the discussion and criticism of different options and alternatives in the problem resolution (competences B1 and C6).</p>

Personalized attention	
Methodologies	Description



Guest lecture / keynote speech	Keynote session: attend and answer questions from students in relation to the theoretical material exposed in the lectures.
Laboratory practice	Laboratory practice: attend and answer questions from students in relation to proposed or carried out in the laboratory practices.
Supervised projects	Supervised projects: attend and answer questions from students in relation to the proposed projects.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Laboratory practice	A32 A34 B1 C6 C7	Evaluation of the work done by the student in the laboratory practice by means of mixed tests.	40
Supervised projects	A32 A34 B1 C6 C7 C8	Evaluation of the work done by the student in the supervised projects by means of mixed tests.	30
Mixed objective/subjective test	A32 A34 B1 C6	The knowledge of the subject will be valued (including the problem solving) by means of mixed tests.	30

Assessment comments
<p>The subject is approved by obtaining at least 50% of the rating.</p> <p>It is necessary to get more than 30% of the note in each section: laboratory practice, supervised projects and mixed practice.</p> <p>Part-time students could present all the practices of non Presential form.</p> <p>But the mixed objective/subjective test and defense of supervised projects will be mandatory. In the July evaluation, a mixed objective/subjective test and defense of supervised project will be valued.</p>

Sources of information	
<b>Basic</b>	<ul style="list-style-type: none"> <li>- Reto Meier (2016). Professional Android. WRox</li> <li>- Wie Meng Lee (2012). Android 4 Desarrollo de aplicaciones. Wrox (Anaya Multimedia)</li> <li>- Scott McCracken (2012). Android. Curso de desarrollo de aplicaciones. Inforbook</li> <li>- Joan Ribas Lequerica (2014). Manual imprescindible de desarrollo de aplicaciones para Android. Anaya Multimedia</li> <li>- Jesús Tomás Gironés (2012). El gran libro de Android. Marcombo</li> <li>- Joseph Annuzzi, Lauren Darcey y Shane Conder (2015). Introduction to Android Application Development. Android Essentials. Addison-Wesley</li> <li>- Erik Hellman (2013). Android Programming: Pushing the Limits. Wiley</li> </ul>
<b>Complementary</b>	<ul style="list-style-type: none"> <li>- José Enrique Amaro Soriano (2012). Android. Programación de dispositivos móviles a través de ejemplos. Marcombo</li> <li>- Joan Ribas Lequerica (2012). Desarrollo de aplicaciones para Android. Anaya</li> <li>- Lauren Darcey y Shane Conder (2012). Android Application development in 24 hours. SAMS</li> <li>- Anders Goransson (2014). Efficient Android Threading: Asynchronous Processing Techniques for Android Applications. O'Reilly Media</li> <li>- Joshua J. Drake , Zach Lanier , Collin Mulliner , Pau Oliva Fora, Stephen A. Ridley , Georg Wichersk (2014). Android Hacker's Handbook. Wiley</li> </ul>

Recommendations
<b>Subjects that it is recommended to have taken before</b>
<p>Operating Systems/614G01016</p> <p>Concurrency and Parallelism/614G01018</p>
<b>Subjects that are recommended to be taken simultaneously</b>



Embedded Systems/614G01060

Subjects that continue the syllabus

Other comments

(\*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.