



## Teaching Guide

| Teaching Guide           |                                                                                                                                                                          |        |                        |           |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------------------------|-----------|
| Identifying Data         |                                                                                                                                                                          |        |                        | 2019/20   |
| Subject (*)              | Architectures and Mobile Platforms                                                                                                                                       |        | Code                   | 614502005 |
| Study programme          | Mestrado Universitario en Enxeñaría Informática (plan 2012)                                                                                                              |        |                        |           |
| Descriptors              |                                                                                                                                                                          |        |                        |           |
| Cycle                    | Period                                                                                                                                                                   | Year   | Type                   | Credits   |
| Official Master's Degree | 2nd four-month period                                                                                                                                                    | First  | Obligatory             | 6         |
| Language                 | SpanishGalician                                                                                                                                                          |        |                        |           |
| Teaching method          | Face-to-face                                                                                                                                                             |        |                        |           |
| Prerequisites            |                                                                                                                                                                          |        |                        |           |
| Department               | Enxeñaría de Computadores                                                                                                                                                |        |                        |           |
| Coordinador              | Fernández Caramés, Tiago Manuel                                                                                                                                          | E-mail | tiago.fernandez@udc.es |           |
| Lecturers                | Fernández Caramés, Tiago Manuel                                                                                                                                          | E-mail | tiago.fernandez@udc.es |           |
| Web                      | <a href="https://moodle.udc.es/course/view.php?id=50538">https://moodle.udc.es/course/view.php?id=50538</a>                                                              |        |                        |           |
| General description      | In this subject the student gains basic knowledge about mobile technologies and their application by means of design and development of applications for mobile devices. |        |                        |           |

## Study programme competences

| Code | Study programme competences                                                                                                                                                                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A11  | Capacidade de deseñar e desenvolver sistemas, aplicacións e servizos informáticos en sistemas encaixados e ubicuos.                                                                                                                                                                         |
| B1   | Capacidade de resolución de problemas.                                                                                                                                                                                                                                                      |
| B5   | Habilidades de xestión da información.                                                                                                                                                                                                                                                      |
| B9   | Capacidade para xerar novas ideas (creatividade).                                                                                                                                                                                                                                           |
| B10  | Capacidade para proxectar, calcular e deseñar produtos, procesos e instalacións en todos os ámbitos da enxeñaría informática                                                                                                                                                                |
| B13  | Capacidade para o modelado matemático, cálculo e simulación en centros tecnolóxicos e de enxeñaría de empresa, particularmente en tarefas de investigación, desenvolvemento e innovación en todos os ámbitos relacionados coa Enxeñaría en Informática                                      |
| B14  | Capacidade para a elaboración, planificación estratéxica, dirección, coordinación e xestión técnica e económica de proxectos en todos os ámbitos da Enxeñaría en Informática seguindo criterios de calidade e ambientais                                                                    |
| B17  | Capacidade para a aplicación dos coñecementos adquiridos e de resolver problemas en contornas novas ou pouco coñecidos dentro de contextos máis amplos e multidisciplinares, sendo capaces de integrar estes coñecementos                                                                   |
| B21  | Posuír e comprender coñecementos que acheguen unha base ou oportunidade de ser orixinais no desenvolvemento e/ou aplicación de ideas, a miúdo nun contexto de investigación                                                                                                                 |
| B22  | Que os estudantes saiban aplicar os coñecementos adquiridos e a súa capacidade de resolución de problemas en contornas novas ou pouco coñecidos dentro de contextos máis amplos (ou multidisciplinares) relacionados coa súa área de estudo                                                 |
| B23  | Que os estudantes sexan capaces de integrar coñecementos e enfrontarse á complexidade de formular xuízos a partir dunha información que, sendo incompleta ou limitada, inclúa reflexións sobre as responsabilidades sociais e éticas vinculadas á aplicación dos seus coñecementos e xuízos |
| B25  | Que os estudantes posúan as habilidades de aprendizaxe que lles permitan continuar estudando dun modo que haberá de ser en gran medida autodirixido ou autónomo                                                                                                                             |
| C4   | Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.                                      |
| C6   | Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.                                                                                                                                                           |
| 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 |
|-------------------|-----------------------------|
|-------------------|-----------------------------|



|                                                                         |      |                                                                               |                          |
|-------------------------------------------------------------------------|------|-------------------------------------------------------------------------------|--------------------------|
| Understand, design and develop systems and services for mobile devices. | AJ11 | BJ1<br>BJ5<br>BJ9<br>BJ10<br>BJ13<br>BJ14<br>BJ17<br>BC1<br>BC2<br>BC3<br>BC5 | CJ4<br>CJ6<br>CJ7<br>CJ8 |
|-------------------------------------------------------------------------|------|-------------------------------------------------------------------------------|--------------------------|

| Contents                                           |                                                                                                                                                                                         |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Topic                                              | Sub-topic                                                                                                                                                                               |
| Introduction to mobile architectures and platforms | Hardware: architectures and platforms. ARM architecture.<br><br>Software: platforms and mobile operative systems. Historic perspective, development ecosystem, market and monetization. |
| User experience: Usability and user interfaces     | Introduction to mobile app and user interface usability<br><br>Style guides and design pattern for graphic user interfaces for mobile devices. Examples.                                |



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|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mobile device architecture and software design. Application to Android | <p>Building a first app: environment and development and debugging tools</p> <p>App components</p> <p>Relationship among apps, virtual machines and Linux processes</p> <p>Activity Life-cycle</p> <p>Task parallelization: AsyncTask</p> <p>Data serialization/deserialization, Fragments and Parcelables</p> <p>Services</p> <p>Content Providers, Content Resolvers, Loaders</p> <p>Recycler View</p> <p>Apps, processes and threads: IPC in Android</p> <p>Android Binder</p> <p>Geolocation</p> <p>Storage</p> <p>Multimedia</p> <p>Mobile device software patterns: MVC and its versions</p> |
| Event-guided programming and concurrency management                    | <p>Event-guided programming. Advanced concepts</p> <p>Patterns: Publisher/Subscriber, Active Object, Monitor Object, Half/Sync-Half-Async and Thread Pool.</p> <p>Application to Android</p>                                                                                                                                                                                                                                                                                                                                                                                                       |
| Web based, hybrid and native applications                              | <p>Mobile web application development</p> <p>Hybrid mobile application development</p> <p>Development frameworks</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Mobile platform sensing                                                | <p>Transducers</p> <p>Mobile displays. Types and technologies</p> <p>Mobile HMI</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pantallas e Mobile HMI                                                 | <p>Pantallas nos dispositivos m3viles. Tipos e tecnolox3as empregadas.</p> <p>Mobile HMI.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



## Planning

| Methodologies / tests                                                                                                           | Competencies                                     | Ordinary class hours | Student's personal work hours | Total hours |
|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------|-------------------------------|-------------|
| Guest lecture / keynote speech                                                                                                  | A11 B5 B10 B13 B14<br>B17 B21 B25 C4 C6<br>C7 C8 | 21                   | 33                            | 54          |
| ICT practicals                                                                                                                  | A11 B1 B5 B9 B10<br>B13 B14 B22 B23              | 26                   | 52                            | 78          |
| Objective test                                                                                                                  | B1 B17 B22 B23                                   | 4                    | 0                             | 4           |
| Personalized attention                                                                                                          |                                                  | 14                   | 0                             | 14          |
| (*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students. |                                                  |                      |                               |             |

## Methodologies

| Methodologies                  | Description                                                            |
|--------------------------------|------------------------------------------------------------------------|
| Guest lecture / keynote speech | Lectures on the content of the subject                                 |
| ICT practicals                 | ICT practicals to put in practice the concepts learned on the lectures |
| Objective test                 | Test to assess the learned practical and theoretical concepts          |

## Personalized attention

| Methodologies  | Description                                                                                                                                                                                                                                                                                                                                         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ICT practicals | The professor will tutor the students and will guide them during the practical lessons.<br><br>Part-time students: it will not be required the attendance to the practical lessons, which will be flexible with the delivery and defence dates. In the same way, tutoring will be adapted to the scheduling restrictions of the part-time students. |

## Assessment

| Methodologies  | Competencies                        | Description                                                                   | Qualification |
|----------------|-------------------------------------|-------------------------------------------------------------------------------|---------------|
| ICT practicals | A11 B1 B5 B9 B10<br>B13 B14 B22 B23 | Valoración dos resultados e coñecementos obtidos nas prácticas desenvolvidas. | 60            |
| Objective test | B1 B17 B22 B23                      | Valoración das competencias asimiladas na materia.                            | 40            |

## Assessment comments

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| <p>The practical part of the subject will consist in developing practical examples about the content of the theory lessons. Its evaluation will be performed progressively, with clear deadlines. Such a practical part could be replaced with the development of a mobile application or a individual assignment. The objective test will be divided into two parts: one oriented towards evaluating the practical developments and a second one about the theoretical content.</p> <p>Part-time students: attendance to the practical part will not be required and its delivery will follow a flexible schedule.</p> |
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## Sources of information

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic | <ul style="list-style-type: none"> <li>- Theresa Neil (2012). Mobile Design Pattern Gallery. O'Reilly</li> <li>- N. D. Lane (2010). A Survey of Mobile Phone Sensing. IEEE Communications Magazine</li> <li>- Keith Andrews (2012). Human-Computer Interaction. Graz University of Technology</li> <li>- Zheng-Hua Tan (2004). Instrumentation and data acquisition. Aalborg University, Denmark</li> <li>- Google (2013). Android developers website. <a href="http://developer.android.com">http://developer.android.com</a></li> </ul> <p><a href="http://developer.android.com/training/index.html">http://developer.android.com/training/index.html</a></p> |
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|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Complementary</b> | <ul style="list-style-type: none"><li>- Pei Zheng (2005). Smart Phone and Next Generation Mobile Computing. Morgan Kaufmann</li><li>- Sajal K. Das (2010). Mobile Handset Design . Wiley</li><li>- Lauren Darcey (2011). Sams Teach Yourself Android Application Development in 24 Hours. Sams</li><li>- Jakob Strom (2012). HMI Toolsuite for Android. Chalmers University of Technology, Gothenburg</li><li>- Ricardo Galli Granada (2015). Principios y algoritmos de concurrencia. Autoeditado</li></ul> <p>El libro "Principios y algoritmos de concurrencia" está disponible en Google Books.</p> |
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## Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

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.