



Universitat de Lleida

DEGREE CURRICULUM  
**NETWORKED COMPUTING  
PLATFORMS**

Coordination: SENDÍN VELOSO, MONTSERRAT

Academic year 2017-18

Subject's general information

<b>Subject name</b>	NETWORKED COMPUTING PLATFORMS			
<b>Code</b>	102030			
<b>Semester</b>	2nd Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	<b>Degree</b>	<b>Course</b>	<b>Typology</b>	<b>Modality</b>
	Bachelor's Degree in Computer Engineering	4	COMPULSORY	Attendance-based
<b>ECTS credits</b>	6			
<b>Groups</b>	1GG			
<b>Theoretical credits</b>	3			
<b>Practical credits</b>	3			
<b>Coordination</b>	SENDÍN VELOSO, MONTSERRAT			
<b>Department</b>	INFORMATICA I ENGINYERIA INDUSTRIAL			
<b>Teaching load distribution between lectures and independent student work</b>	– Independent student work (70%) = 105h – Presential work (30%) = 45h			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Preferably Catalan (Spanish if any student shows difficulties with Catalan).			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
AGOST MORÉ, JORGE	jordi.agost@udl.cat	2	
SENDÍN VELOSO, MONTSERRAT	msendin@diei.udl.cat	4	

## Subject's extra information

This subject is located in the 2nd semester of the fourth course. Belongs to the specialization module 'Information Technologies'. It can be considered as a continuation of the subject 'Applications for Mobile Devices'.

So, to follow this subject properly some previous knowledge in Android programming is recommended (essential aspects covered in the previous subject).

## Learning objectives

- Deepen the Android platform and elements that comprise it
- Consider diverse cost and quality parameters (battery consumption and other resources)
- Managing the data provided by sensors of a device
- Knowing some of the most used API related to location
- Knowing the different options for connecting to the network
- Handle networking options most used
- Combine and communicate client and server parts correctly
- Synchronize data with Cloud Computing
- Work with Web Services
- Being able to conceive, design your own development and adequately describe the functionality of a certain app, exploiting their possibilities of mobile computing

## Competences

### Strategic Competitions of the UdL

**CT2.** Mastering a foreign language, especially English.

**CT3.** Training Experience in the use of the new technologies and the information and communication technologies.

### Specific Competitions

**GII-TI4.** Capacity to choose, design, deploy, integrate and manage networks and infrastructures of communications in an organisation.

**GII-TI5.** Capacity to select, deploy, integrate and manage systems of information that satisfy the needs of the organisation, within the cost and quality requirements.

**GII-TI6.** Capacity to conceive systems, applications and services based in network technologies, including Internet, web, e-commerce, multimedia, interactive services and mobile computation.

**GII-TI7.** Capacity to comprise, apply and manage the computer systems guarantee and security.

## Cross-disciplinary competitions

**EPS11.** Capacidad de comprender las necesidades del usuario expresadas en un lenguaje no técnico

## Subject contents

### Mobile Platforms

1. Sensor management and other hardware features
2. Basic networking in Android
3. Access to Web services based on *Cloud Computing*
  - 3.1. Cloud services provider *Firebase*
  - 3.2. Access to the realtime DDBB
  - 3.3. Authentication
  - 3.4. Push notifications: *Firebase Cloud Messaging* and *Firebase Cloud Functions*
4. *Cloud Computing*
  - 4.1. Preliminary notions
  - 4.2. Models: Infrastructure as a Service (IaaS)
5. *Introducing Node-JS*
  - 5.1. What is Node-JS
  - 5.2. Requirements
  - 5.3. Functions and Objects
  - 5.4. Npm
  - 5.5. JSON
6. Developing a Web server. API REST
  - 6.1. Express.JS
  - 6.2. MiddleWare
  - 6.3. Rest Architecture
  - 6.4. RestFul Web Services
7. Connecting to the mobile app
  - 7.1. Postgress and Heroku

7.2. Deploying our app to Heroku

7.3. Scaling the app

## Methodology

**Big-size Groups: Laboratory sessions addressed to the assimilation and put into practice of concrete concepts (6 credits)**

- **Problem Based Learning:** Guided classes addressed to solve little projects, counting with the personalized monitoring of the professor.
  - **Theoretical part:** A short introduction to each specific topic, supported by snapshots and/or specific material. The rest of the class is addressed to an active learning by the student, culminating in a little practical application.
  - **Practical application part:** based on examples and little projects (*mini-activities*), which are proposed and solved weekly.

**Autonomous work (non presential):**

- The practical work (*mini-activities* and course project) will be completed in non presential hours.
- **The student will have to** deepen the study of the various topics on their own, as well as the exploration of the various options that are presented.
- In developing the **course project**, students must develop **critical thinking** in order to select and reasonably justify their decision making.

The **evaluation system** (detailed in the corresponding section) is composed of: 1) one written test (1st midterm exam); and 2) practices (to develop in groups of two people).

## Development plan

Week	Laboratory addressed session - Theoretical part (BsG)	Laboratory addressed session - Practical part (BsG)	Autonomous work
1	Subject presentation T1: Sensor management and other hardware features	<i>MiniActiv-1</i> : Good practices in sensors usage	Autonomous learning, <i>MiniActiv-1</i> completion and <i>Course project</i> gestation
2	T1: Sensor management and other hardware features	Delivery 1 <i>Course project</i> development <i>MiniActiv-2</i> : Location providers management	Autonomous learning, <i>Course project</i> gestation and. <i>MiniActiv-2</i> . completion Delivery 1 <i>Course project</i>
3	T1: Sensor management and other hardware features	<i>MiniActiv-3</i> : Preparing <i>HelloMap</i>	Autonomous learning, <i>MiniActiv-3</i> completion and app. eskeleton starting
4	T2: Basic networking in Android	<i>MiniActiv-4</i> : Verifying network state and HTTP operations	Autonomous learning, <i>MiniActiv-4</i> completion and Delivery 2 <i>Course project</i> development.



Part	Midterm exam Concepts and problem solving	15%	3,0	No	Yes	Yes	Yes
MiniActivs	Pack of Mini-activities	10%	No	Yes	Yes (50%)	Yes	No
Proj	Course project	75%	4,0	Yes	No	Yes	Yes

**Final grade** =  $0,15 * \text{Part} + 0,10 * \text{MiniActivs} + 0,75 * \text{Proj}$

- Subject is passed if **final grade** is greater or equal than **5,0** and midterm is above the minimum required.

### **Other considerations and criteria:**

- Type of exams: concept fixation and problems solving
- Pack of mini-activities (MiniActivs):
  - Continuous work during class sessions
  - *Objective*: put into practice *in-situ* each new topic introduced in class.
  - *Delivery*:
    - Weekly from the 2nd week (*recommendable*)
    - Unique:
      - *9th week* (mini-activities solved in the 1r midterm)
      - *16th week* (mini-activities solved in the 2nd midterm)
- Course project (Proj):
  - Conception, design and development of an Android app in which to put in practical the contents studied in the subject (sensors management, Cloud connection and server and web development)
  - Articulated in 4 deliveries
    - *Weight and calendar of each delivery*:
      - *1st Delivery*. App gestation: 2th week (7% of the final mark)
      - *2nd Delivery*. App central core (eskeleton): 6th week (15%)
      - *3th Delivery*. Additional functionality (muscle) with cloud synchronization: 8th week (17%)
      - *4th Delivery*. Server and web development: 15th week (18%)
      - *Final project oral presentation*: 18%
        - To be realized the 2nd midterm day
      - Additionally, an extra part consisting in Requirement analysis can be delivered OPTionally (15%)
    - A set of compulsory and essential programming requirements will be established. Also additional requirements, which will be considered as extra points in the grade.
    - *Avaluation and recovery system*: continuous avaluation
      - Students receive feedback according to established mark criteria.
        - *2nd delivery*: Possibility to improve through 3rd delivery
        - *4th delivery*: personalized interview during the 20th week, in order to bring improvements
- For all activities: programmed deliveries, unmovable dates

## Bibliography

### **Basic bibliography**

#### **Mobile Platforms**

- Android in Action. W. F. Ableson, R. Sen, C. King and C. E. Ortiz. Manning Publications Co. Third Edition (2011).

#### **RESTful**

- REST API Design Rulebook. Designing Consistent RESTful Web Service Interfaces. Mark Masse (2011)

## **Node.js**

- Node: Up and Running. Scalable Server-Side Code with JavaScript. Tom Hughes-Croucher, MikeWilson. O'Reilly Media 2012

## ***Complementary bibliography***

### **Mobile Platforms**

- The Android Developer's Cookbook: Building Applications with the Android SDK. J. Steele. Addison-Wesley Professional (2011)

### **RESTful**

- REST API Design Rulebook. Designing Consistent RESTful Web Service Interfaces. Mark Masse (2011)

## **Node.js**

- What Is Node? JavaScript Breaks Out of the Browser. Brett McLaughlin. O'Reilly Media 2011