Universitat de Lleida

DEGREE CURRICULUM
NETWORKED COMPUTING PLATFORMS

Coordination: SENDÍN VELOSO, MONTSERRAT

Academic year 2017-18

NETWORKED COMPUTING PLATFORMS 2017-18

Subject's general information

Subject name	NETWORKED COMPUTING PLATFORMS
Code	102030
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	

Degree	Course	Typology	Modality
Bachelor's Degree in Computer Engineering	4	COMPULSORY	Attendance-based

ECTS credits	6
Groups	1GG
Theoretical credits	3
Practical credits	3
Coordination	SENDÍN VELOSO, MONTSERRAT
Department	INFORMATICA I ENGINYERIA INDUSTRIAL
Teaching load distribution between lectures and independent student work	– Independent student work (70%) = 105h – Presential work (30%) = 45h
Important information on data processing	Consult this link for more information.
Language	Preferably Catalan (Spanish if any student shows dificulties 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 forth 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 lenguage no técnico

Subject contents

Mobile Platforms

1. Sensor management an 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 Acces to the realtime DDBB

    3.3 Authentication

    3.4 Push notifications: *Firebase Cloud Messaging* and *Firebase Cloud Functions*

4. *Cloud Computing*

    4.1. Preliminar notions

    4.2. Models: Infrastructure as a Service (IaaS)

5. *Introducing Node-JS*

    5.1. What is Node-JS

    5.2. Requeriments

    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.
  - **Theorical 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, culmining in a little practical application.
  - **Practical application part:** based on exemples 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 el corresponding section) is composed of: 1) one writen test (1rst midterm exam); and 2) practices (to develop in groups of two people).

Development plan

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

5	T2: Basic networking in Android.	*MiniActv-5*: Programming sockets	Autonomous learning, *MiniActiv-5* completion and Delivery 2 *Course project* development.
6	T3: Access to Web services basen on *Cloud Computing*	*MiniActv-6*: Fist experience with *FireBase* (part I)	Autonomous learning, *MiniActiv-5* completion and Delivery 2 *Course project* completion . Delivery 2 *Course project*
7	T3: Access to Web services basen on *Cloud Computing*	*MiniActv-6*: Fist experience with *FireBase* (part II)	Autonomous learning, *MiniActiv-6* completion and app. muscle starting
8	T3: Access to Web services basen on *Cloud Computing*	*MiniActv-7*: Receiving *Push notifications*	Autonomous learning, *MiniActiv-7* completion and Delivery 3 *Course project* development
9	Midterm exam		Delivery 3 *Course project* completion
10	T4: Cloud Computing		Delivery 3 *Course project*
11	T5: Introducing Node-JS	*MiniActv-8*: Management system	Autonomous learning, and *MiniActiv-9* completion
12	T6: Developing a web Server. Express JS. MiddleWare	*MiniActv-9*: Basic Web Server	Autonomous learning and *MiniActiv-10* completion
13	T7: Connecting to the mobile App	*MiniActv-10*: Heroku Base Applicatiion	Autonomous learning and *MiniActiv-11* completion
14		Delivery 4 *Course project* development	Autonomous learning and Delivery 4 *Course project* development
15		Delivery 4 *Course project* development	Autonomous Work and Delivery 4 Course project development
16	2nd midterm week		Delivery 4 *Course project* development
17	2nd midterm week		Delivery 4 *Course project* development
18	Tutories		Delivery 4 *Course project development*
19	Recovery		
20	Personalized interview (if Delivery 3 and/or Delivery 4 *Course project* are below the minimum mark required)		

Evaluation

Activt.	Description	Weight	Minimum Grade	In group	Presential	Mandatory	Recoverable

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 * Part + 0,10 * MiniActivs + 0,75 * 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*:
      - *1rst Delivery.* App gestation: 2th week (7% of the final mark)
      - *2nd Delivery.* App central core (eskeleton): 6th week (15%)
      - *3rd Delivery.* Addicional 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 throught 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)

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