Universitat de Lleida

DEGREE CURRICULUM
WEB PROJECT

Coordination: GARCIA GONZALEZ, ROBERTO

Academic year 2020-21

Subject's general information

Subject name	WEB PROJECT
Code	102023
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION

Typology	Degree	Course	Character	Modality
	Double bachelor's degree: Degree in Computer Engineering and Degree in Business Administration and Management	3	COMPULSORY	Attendance-based
	Bachelor's Degree in Computer Engineering	3	COMPULSORY	Attendance-based

Course number of credits (ECTS)	6

Type of activity, credits, and groups	Activity type	PRAULA	TEORIA
	Number of credits	3	3
	Number of groups	2	1

Coordination	GARCIA GONZALEZ, ROBERTO
Department	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING
Teaching load distribution between lectures and independent student work	Total load: 150h - Lectures (40%) = 60h - Independent student work (60%) = 90h
Important information on data processing	Consult this link for more information.
Language	English

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GARCIA GONZALEZ, ROBERTO	roberto.garcia@udl.cat	7,2	
MATEU PIÑOL, CARLOS	carles.mateu@udl.cat	3,6	

Subject's extra information

To properly follow this subject, it is recommended to have consolidated the programming and databases skills taught in the previous Programming I and II, Data Structures and Databases courses, as well as the skills related to communication protocols presented on the Networks course.

Learning objectives

- Understand and apply the principles, methodologies and life cycles of software engineering and project development on the Web.
- Apply the principles of agile development for the creation of a Web application, including specification by example, collaborative development and shared code repositories.
- Understand the principles of the Web, from the Web 1.0 through 2.0 and future trends of Web 3.0.
- Apply the principles of the Web to the development of highly scalable applications following REST principles and resources oriented architectures ROA.
- Develop REST Web applications using Python and Django.

Competences

Cross-disciplinary Competences

EPS7. Capacity to work in situations with a lack of information and/or under pressure.

Specific Competences

GII-CRI11. Knowledge and application of the characteristics, functionalities and structure of the Distributed Systems, the Networks of Computers and Internet and design and implement applications based in them.

GII-CRI14. Knowledge and application of the basic principles and basic techniques of the parallel, concurrent, distributed and of real time programming.

GII-CRI16. Knowledge and application of the principles, methodologies and life cycle of the software engineering.

Subject contents

1. **Origins, Web 1.0** (Carles Mateu)
   - Core technologies of the Web 1.0
     - HTML, CSS, XML, JSON.
     - HTTP
   - Architecture and Patterns for Web 1.0 Applications

- Client / Server, ...
    - Web 1.0 Application Development
        - Web Application/Service Client
        - Django data model
        - Django Admin
        - Continuous Integration and Deployment (TravisCI, Heroku, Docker)
2. **Success, Web 2.0** (Roberto García)
    - Core technologies of Web 2.0
        - Javascript, XMLHttpRequest, JQuery
    - Architecture and Patterns for Web 2.0 applications
        - REST Web services, APIs, RESTful, ROA
    - Web 2.0 Application Development
        - Agile Development (Scrum / Kanban)
        - Specification by Example (Gherkin)
        - End-to-End Testing (Behave / PhantomJS)
3. **Future, Web 3.0 and Semantic Web** (Roberto García)
    - Core technologies of the Semantic Web
        - RDF, OWL, SPARQL
    - Architecture and Patterns for Web 3.0 applications
        - Linked Data, Semantic Annotations
    - Web 3.0 Application Development
        - RDFa, schema.org

Methodology

The methodology is based on **Project Based Learning** where the students are responsible for developing all phases of a software project. In this case, students will to develop a Web application.

This project is divided into iterations that, following and Agile approach, focus on quick delivery of the most valuable features from the stakeholders' point of view. To this end, a Behaviour Driven Development approach is followed, which includes the following stages for each iteration:

- **Specification**: from the set of identified desired behaviours, the most valuable one is picked and detailed using a specification by example approach. Concrete scenarios are modelled from the user perspective together with acceptance criteria.
- **Development**: the acceptance criteria for the identified scenarios is implemented and then the parts of the Web application under development required to fulfil them.
- **Testing**: it is verified if the intended behaviour has been properly implemented using automated unit and end-to-end tests. These tests are automated using a Continuous Integration tool like Travis-CI.
- **Deployment**: to complete the Agile approach, deployment is also automated so the last version of the software satisfying all tests is always available for stakeholders. Heroku is used as the deployment environment.

The web application is developed using one of the most appropriate frameworks from the educational point of view, Python and Django. It begins by introducing the basics of the Web, called Web 1.0, which students then apply to the lab to develop a Web application and deploy it to the cloud. It then continues with the concepts of Web 2.0 and Web 3.0, that students apply iteratively and incrementally, following an Agile approach, to develop a Web application project during the course.

Students define their own project, under professors' guidance for a homogeneous difficulty, and develop it in **groups of 4 or 5 people**.

Development plan

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Week	Description	Big Group Face-to-Face Activities	Small Group Face-to-Face Activities	Student Autonomous Activities
1	Web 1.0	Subject presentation Core technologies of the Web 1.0	Python tools configuration for project	Skills consolidation and application to project
2	Web 1.0	Core technologies of the Web 1.0	Deployment tools Intro	Skills consolidation and application to project
3	Web 1.0	Core technologies of the Web 1.0	HTTP client tools	Skills consolidation and application to project Deliverable 0 (non-assessable)
4	Web 1.0	Architecture and Patterns for Web 1.0 Applications	Django Web 1.0 Tutorial	Skills consolidation and application to project
5	Web 1.0	Architecture and Patterns for Web 1.0 Applications	Django Web 1.0 Tutorial	Skills consolidation and application to project
6	Web 1.0	Architecture and Patterns for Web 1.0 Applications	Deployment tools Cont	Skills consolidation and application to project
7	Web 2.0	Web 2.0 Introduction	Django Web 2.0 Tutorial	Skills consolidation and application to project
8		HOLIDAY	HOLIDAY	Skills consolidation and application to project
9	Web 2.0	HOLIDAY	Django Web 2.0 Tutorial	Skills consolidation and application to project
10		1st Midterm Exam		Study
11	Web 2.0	Web 2.0 Introduction	Django Web 2.0 Tutorial	Skills consolidation and application to project Deliverable 1
12	Web 2.0	AJAX	Django Web 2.0 JQuery Autocomplete Tutorial	Skills consolidation and application to project
13	Web 2.0	HOLIDAY	HOLIDAY	Skills consolidation and application to project
14	Web 2.0	Resource Oriented Architecture	Django Web 2.0 RESTful API Tutorial	Skills consolidation and application to project
15	Web 2.0	Resource Oriented Architecture	Django Web 2.0 RESTful API Tutorial	Skills consolidation and application to project Deliverable 2
16	Web 3.0	Web 3.0 Introduction	Django Web 3.0 RDFa Tutorial	Skills consolidation and application to project
17-18		2nd Midterm Exam		Study Deliverable 3

Evaluation

Acr.	Evaluation Activity	Rate	Minimum Qualification	Group Activity	Mandatory	Remedial Exam
P1	1st Midterm Exam	17%	NO	NO	YES	NO
P2	2nd Midterm Exam	17%	NO	NO	YES	NO
E1	1st Project Deliverable	22%	NO	3 o 4	YES	NO

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Acr.	Evaluation Activity	Rate	Minimum Qualification	Group Activity	Mandatory	Remedial Exam
E2	2nd Project Deliverable	22%	NO	3 o 4	YES	NO
E3	3rd Project Deliverable	22%	NO	3 o 4	YES	NO
Final Qualification = 0,17*P1 + 0,17*P2 + 0,22*E1 + 0,22*E2 + 0,22*E3						

The evaluation is fundamentally based on the development of a software project in a **group of 3 or 4 people**, chosen by the students under the professor guidance, with two intermediate deliverables and a final one:

- 1st Deliverable: 22% grade
  Basic Web application using Web 1.0.
- 2nd Deliverable: 22% grade
  Modern Web application following Web 2.0 principles.
- 3rd Deliverable: 22% grade
  Advanced Web application including Web 3.0 technologies.

The evaluation is complemented with two exams:

- 1st Midterm exam: 17% grade, individual evaluation. Validate knowledge about Web 1.0.
- 2nd Midterm exam: 17% grade, individual evaluation. Validate knowledge about Web 2.0, Web 3.0 and project development.

Bibliography

- Martelli, Alex (2003). Python : guía de referencia. Madrid : Anaya Multimedia. ISBN 9788441523173.
- Martelli, Alex (2006). Python in a nutshell (2nd ed.). Sebastopol : O'Reilly. ISBN 0596100469.
- Richardson, Leonard (2007). RESTful Web Services. Newton, Massachusetts: O'Reilly. ISBN 9780596529260
- Bennett, James (2009). Practical Django projects (2nd ed.). New York, NY: Apress. ISBN 9781430219392.
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