



IDENTIFYING DATA

(*)Enxeñaría Web

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|-------------------|---|-----------|------|------------|
| Subject | (*)Enxeñaría Web | | | |
| Code | V05M145V01233 | | | |
| Study programme | (*)Máster Universitario en Enxeñaría de Telecomunicación | | | |
| Descriptors | ECTS Credits | Choose | Year | Quadmester |
| | 5 | Mandatory | 1st | 2nd |
| Teaching language | Spanish Galician English | | | |
| Department | | | | |
| Coordinator | Santos Gago, Juan Manuel | | | |
| Lecturers | Santos Gago, Juan Manuel | | | |
| E-mail | Juan.Santos@det.uvigo.es | | | |
| Web | http://faitic.uvigo.es | | | |

General description The Web, initially conceived as a simple system for the telematic distribution of information, has become as a whole in the database more extensive and heterogeneous existing today. In addition, the Web has become an important platform for delivery of sophisticated electronic services in very different domains, such as commerce, education, public and private administration, health, leisure, etc.

The fundamental objective of this course is to explore the main techniques and mechanisms that underlie the development of Web applications, i.e. the software applications that provide services to users through a Web browser. It is not the aim of this course to delve into the technologies for building dynamic web pages (it is assumed here that the student has previous knowledge of these issues), but to analyse the techniques and acquire the skills necessary to, on the one hand, be able to locate and use the existing implicit "knowledge" on the web and, on the other hand, be able to design and develop services accordingly to the software distribution models that dominate the web.

Competencies

| | |
|------|--|
| Code | |
| A1 | CB1 The knowledge and understanding needed to provide a basis or opportunity for being original in developing and/or applying ideas, often within a research context. |
| A2 | CB2 Students must apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study. |
| A3 | CB3 Students must integrate knowledge and handle complexity of formulating judgments based on information that was incomplete or limited, including reflections on social and ethical responsibilities linked to the application of their knowledge and judgments. |
| A4 | CB4 Students must communicate their conclusions, and the knowledge and reasons stating them-, to specialists and non-specialists in a clear and unambiguous way. |
| A5 | CB5 Students must have learning skills to allow themselves to continue studying in largely self-directed or autonomous way |
| A10 | CG5 The capacity for development, strategic planning, direction, coordination and technical and financial management of projects in all fields of Telecommunication Engineering following quality and environmental criteria. |
| A11 | CG6 The capacity for general direction, technical direction and management of research, development and innovation projects in companies and technological centers. |
| A13 | CG8 The ability to apply acquired knowledge and to solve problems in new or unfamiliar environments within broader and multidiscipline contexts, being able to integrate knowledge. |
| A24 | CE6 The ability to model, design, implement, manage, operate, and maintain networks, services and contents. |
| A26 | CE8 The ability to understand and know how to apply the operation and organization of the Internet, new generation Internet technologies and protocols, component models, middleware and services. |

Learning aims

| Expected results from this subject | Typology | Training and Learning Results |
|--|---------------------|--------------------------------------|
| Know the evolution of the Web and understand the technologies in use today | know | A26 |
| Know and be able to use advanced search techniques for both Web documents and other resources accessible through the Web | know Know How | A1 A2 |
| Know and be able to use mechanisms to represent and manage knowledge on the Web | know Know How | A1 A2 |
| Acquire skills to design, plan and analyze innovative Web applications using component models | know Know How | A3 A5 A11 A13 A24 A26 |
| Acquire skills for developing, implement, operate, and communicate the results of a proposed Web application | Know How Know be | A4 A10 A11 A24 A26 |

Contents

| Topic | |
|---|--|
| 1. The Web | Historical evolution Current status: the cloud |
| Contents of this topic are related to the achievement of competence A26 | |
| 2. Searching information on the Web | Metadata and text indexing Algorithms based on the links Search for similar items |
| Contents of this topic are related to the achievement of competences A1, A2, A5 and A26 | |
| 3. Knowledge Representation on the Web | Processing large volumes of data Computational logic and logical inference Protocols of the Semantic Web Semantic Web tools |
| Contents of this topic are related to the achievement of competences A1, A2, A5 and A26 | |
| 4. Software component models for the Web | Folksonomies and social tagging Reference models and architectures Design patterns Description and composition of services |
| Contents of this topic are related to the achievement of competences A2, A5, A24 and A26 | |
| 5. Case Studies | Social Web Internet of Things Collective Web intelligence Cloud Computing |
| Contents of this topic are related to the achievement of competences A3, A4, a5, A10, A11, A13, A24 and A26 | |

Planning

| | Class hours | Hours outside the classroom | Total hours |
|----------------------------------|-------------|-----------------------------|-------------|
| Master Session | 14 | 28 | 42 |
| Autonomous practices through ICT | 9 | 18 | 27 |
| Projects | 3 | 27 | 30 |
| Short answer tests | 2 | 8 | 10 |
| Reports / memories of practice | 1 | 6 | 7 |
| Jobs and projects | 1 | 8 | 9 |

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

Methodologies

| | Description |
|----------------|--|
| Master Session | The first session of the course is aimed to present the context in which the subject is framed and to describe the specific activities to be undertaken by the student to achieve the predefined education objectives. In the subsequent sessions the fundamental concepts addressed in the course are presented in class by the faculty, emphasizing the more complex aspects and proposing possible application scenarios. This methodology is mainly focused to the achievement of the competencies A1, A5, A11 and A26. |

Autonomous practices through ICT The faculty proposes a number of exercises (to be individually done) in order to practice with the concepts and techniques discussed in the theoretic lectures. In particular, it is envisaged the realization of practical exercises to be solved in the laboratory about i) search algorithms of general information and ii) access and manipulation of information represented by techniques of Knowledge Representation on the Web.

This methodology is mainly focused to the achievement of the competencies A3 and A5.

Projects The students, organized in groups of 2 or 3 people, will have to carry out a complete case study, consisting of the proposal, design, development and presentation of a web application that makes use of the technologies and techniques discussed in first part of the course.

This methodology is mainly focused to the achievement of the competencies A2, A4, A10, A11, A13 and A24.

Personalized attention

Methodologies Description

Projects Teachers will regularly monitor the work carried out by each of the members of the groups formed for the development of projects

Assessment

| | Description | Qualification |
|--------------------------------|---|---------------|
| Short answer tests | Students will conduct individually, without supporting material, a knowledge test. This test will consist of a written exam in which questions relating to theoretical concepts covered in the keynote sessions arise. | 30 |
| | This assessment procedure evaluates competencies A26 and A1. | |
| Reports / memories of practice | Students must individually submit a report for each of the practical exercises proposed by the faculty. The report will qualitatively describe the adopted solution for every problem, justifying, when relevant, its use over other alternatives and will detail the developed code. | 30 |
| | This assessment procedure evaluates competencies A2 and A5. | |
| Jobs and projects | Students must submit a project proposal according to a predetermined model. This proposal will be presented in class and analyzed and valued by classmates (peer review) and by the lecturer according to a predefined rubric. The rubric will be made available to students before the start of the project. | 40 |
| | This assessment procedure evaluates competencies A3, A4, A11 and A13. | |
| | At project completion, each group must provide a report that documents the design of the proposed solution and the achieved results. This report will be evaluated by the lecturer based on the attainment of the initial objectives and the quality of the solution used to achieve them. | |
| | This assessment procedure evaluates competencies A10, A11, A24 and A26. | |

Other comments on the Evaluation

Two evaluation systems will be offered to the students in this course: Continuous Evaluation and Single Evaluation (at the end of the semester). The student must choose, before the date of realization of the first planned assessment test, the mode that will continue. Once the choice is made, the student may not change the system.

Regardless of the evaluation system chosen, the pass mark for the course is 5 out of 10. Below the characteristics of both systems and the particularities of the subsequent calls are detailed.

Continuous Evaluation

The student must carry out 5 assessment activities that can be divided into 3 groups:

- 1 theoretical exam (theory assessment). The score of this test corresponds to the Grade of Theory (GTheory)
- 2 practical exercises (practical assessment). Each exercise has the same weight in the group and their mean corresponds to the Grade of Practice (GPractice)
- 2 assessment activities related to the development of a project (project assessment). The first activity involves the presentation of a project proposal and has a relative weight of 0.25. The second activity concerns the evaluation of the project elaboration. The weighted average of these activities corresponds to the Grade of Project (GProject).

The student must obtain a minimum grade of 3.5 (out of 10) in each of the groups to pass the course. As long as this condition is met, the final Mark (M) of the student is the weighted average of scores in each group, based on the following relation:

$$M = 0,3 * GTheory + 0,3 * GPractice + 0,4 * GProject$$

If the student has not achieved a score of 3,5 in any of the groups, the final Mark will be the minimum between 4 and the value obtained according to the above relation.

In addition, the following rules must be observed:

- A student attending the first scheduled activity of continuous evaluation is deemed to have definitely choose that the evaluation system, and he/she may not appear as "No Presented" in the transcripts. On the contrary, if the student not attend the first assessment activity, he/she will be deemed to have waived the continuous evaluation and can not participate in any other activities defined for that evaluation system.
- The continuous assessment activities are not recoverable. That is, if a student does not attend any of them at the scheduled date, the faculty has no obligation to repeat it.

Single Evaluation

Students who chooses the Single Evaluation system shall submit the software and the report of a project whose functionality, scope and formats will be agreed upon with the faculty (at least one month prior to the delivery date). In addition, the student must take a written examination that includes both theoretical questions and problems and practical exercises. The date of the examination, and delivery of the project, will be established on the School Board and officially communicated through appropriate channels.

The final Mark in this evaluation system is the harmonic mean of the scores obtained in the examination and in the project.

Evaluation of subsequent calls

The second call will be governed by a procedure similar to the Single Evaluation system. Thus, the student must submit a project report and take a written exam. However, if the student had a score higher than 4 in the project (whether by continuous or single evaluation system) he/she would not be required to submit the project report and he/she would keep the previous score. When submitting the project report, the valid score will be always the mark of the new submission. Similarly, if the student had a score higher than 4 in the theoretical part of the single evaluation system or a mean score over 4 between the scores of theory and practice of the continuous evaluation system, the student may waive the exam, in which case the score would be the previously obtained.

None of the marks obtained in the course, regardless of the chosen system of evaluation will be retained for subsequent courses.

Sources of information

G. Antoniou, P. Groth, F. van Harmele, R. Hoekstra, **A Semantic Web Primer (3th Edition)**, MIT Press,

S. Casteleyn, F. Daniel, P. Dolog, M. Matera, **Engineering Web Applications**, Springer,

G. Shroff, **The Intelligent Web: Search, smart algorithms, and big data**, Oxford University Press,

J. Leskovec, A. Rajaraman, J. Ullman, **Mining of Massive Datasets**, Cambridge University Press,

Recommendations
