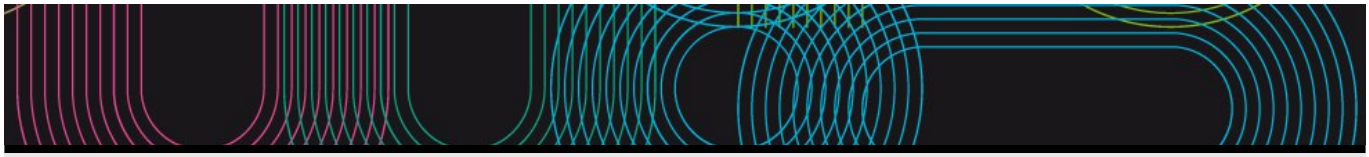

IDENTIFYING DATA				
Web Engineering				
Subject	Web Engineering			
Code	V05M145V01212			
Study programme	Máster Universitario en Ingeniería de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Optional	1st	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Santos Gago, Juan Manuel			
Lecturers	Álvarez Sabucedo, Luis Modesto Santos Gago, Juan Manuel			
E-mail	Juan.Santos@det.uvigo.es			
Web	http://moovi.uvigo.gal			
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. Furthermore, 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 some of 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, on the one hand, to be able to locate and use the existing implicit "knowledge" on the Web and, on the other hand, to be able to design and develop services accordingly to the software distribution models that dominate the Web. The course will be taught in Spanish or Galician, although the teaching materials (slides, bibliographic documentation, etc.) will be available predominantly in English.			

Training and Learning Results	
Code	
A1	CB1 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
B5	CG5 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.
B6	CG6 Capacity for general direction, technical direction and management of research, development and innovation projects in companies and technological centers.
B8	CG8 Ability to apply acquired knowledge and to solve problems in new or unfamiliar environments within broader and multidiscipline contexts, being able to integrate knowledge.
C6	CE6 Ability to model, design, implement, manage, operate, and maintain networks, services and contents.
C8	CE8 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.

Expected results from this subject	
Expected results from this subject	Training and Learning Results
Know the evolution of the Web and understand the technologies in use today	A5 B8 C8
Know and be able to use mechanisms to represent and manage knowledge on the Web	A1 A2 A3 A5 C8
Know to propound, analyze and design innovative Web applications using the models and patterns that predominate in the Web	A2 A4 B5 B6 B8 C6 C8

Contents	
Topic	
The Web The contents of this topic are related to the achievement of competency CE8	Historical evolution and current state Underlying technologies
Searching information on the Web The contents of this topic are related to the achievement of competencies CB1, CB2, CB4, CB5 and CE8	Algorithms based on Information Retrieval techniques Algorithms based on link analysis Processing large volumes of data
Knowledge Representation on the Web The contents of this topic are related to the achievement of competencies CB1, CB2, CB3, CB4, CB5 and CE8	Metadata and text indexing Computational logic and logical inference The Semantic Web: Knowledge on the Web accessible to machines Semantic Web technologies Folksonomies and social tagging
Models of services and components for the Web The contents of this topic are related to the achievement of competencies CB2, CB5, CE6 and CE8	Reference models and architectures Description of Web services Common development patterns on the Web
Case Studies The contents of this topic are related to the achievement of competencies CB2, CB3, CB4, CB5, CG5, CG6, CG8, CE6 and CE8	Recommendation services Social Web Internet of Things Collective Web intelligence

Planning			
	Class hours	Hours outside the classroom	Total hours
Lecturing	14	5	19
Practices through ICT	8	32	40
Project based learning	4	32	36
Essay questions exam	2	6	8
Report of practices, practicum and external practices	0	10	10
Project	2	10	12
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Lecturing	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 learning 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 CB1, CB5 and CE8.

Practices through ICT	The faculty proposes a number of exercises in order to practice with the concepts and techniques discussed in the theoretic lectures. In particular, it is envisaged the realization, in pairs, of practical exercises about i) search algorithms of general information and ii) mechanisms to access and make use of information available on the Web, mainly information published by means of Knowledge Representation techniques. This methodology is mainly focused to the achievement of the competencies CB3, CB4, CB5 and CE8.
Project based learning	The students, organized in groups of 3 or 4 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 CB2, CB4, CG5, CG6, CG8, CE6 and CE8.

Personalized assistance

Methodologies	Description
Lecturing	In the master classes, lecturers will solve particular doubts and will give guidance on the theoretical and practical contents. Information about tutoring can be found in: https://moovi.uvigo.gal/user/profile.php?id=11599 and https://moovi.uvigo.gal/user/profile.php?id=11296
Practices through ICT	During the practice sessions students will be monitored and any questions that may arise will be addressed. Furthermore, lecturers will be available during tutoring hours to solve doubts. Information about tutoring can be found in: https://moovi.uvigo.gal/user/profile.php?id=11599 and https://moovi.uvigo.gal/user/profile.php?id=11296
Project based learning	During the project sessions students will be monitored and any questions that may arise will be addressed. Furthermore, lecturers will be available during tutoring hours to solve doubts. Information about tutoring can be found in: https://moovi.uvigo.gal/user/profile.php?id=11599 and https://moovi.uvigo.gal/user/profile.php?id=11296

Assessment

	Description	Qualification	Training and Learning Results		
Essay questions exam	Students will conduct individually, without supporting material, a knowledge test. This test will consist of a written exam in which questions and exercices relating to theoretical concepts covered in the keynote sessions arise.	35	A1 A4 A5		C8
Report of practices, practicum and external practices	Students must submit a report for each of the practical exercises proposed by the faculty. The reports must describe quantitatively and qualitatively the solutions adopted, justifying its use over other alternatives when relevant.	35	A2 A3 A4	B8	C8
Project	In a first phase, students must prepare a proposal for an innovative project that makes use of technologies and techniques discussed in the course. 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. In a second phase, 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.	30	A3 A4	B5 B6 B8	C6 C8

Other comments on the Evaluation

Two assessment systems will be offered to the students in this course: Continuous Assessment and Global Assessment. Regardless of the assessment system chosen, the pass mark for the course is 5 out of 10. Below the characteristics of both systems are detailed.

Continuous Assessment

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

- 2 practical exercises (practical assessment). These exercises are done by pairs, achieving both members the same score. Each exercise has the same weight and their mean corresponds to the Grade of Practice (GPractice).

- 2 assessment activities related to the development of a project (project assessment) carried out by a group of 3-4 students. The first activity involves the presentation of the project proposal and has a relative weight of 0.4. The second activity concerns the assessment of the project elaboration, for which "work packages", individually coordinated by each group member, will be defined. Each activity is evaluated according to a predefined rubric which includes elements of group evaluation (e.g. level of innovation of the proposal, degree of utilization of techniques discussed in class) and elements of individual assessment (e.g. quality of the exposition, achievements in the assigned "work package"). The weighted average of these activities corresponds to the Grade of Project (GProject).

- 1 theoretical examination (theory assessment). The score of this exam corresponds to the Grade of Theory (GTheory).

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 = 0,35 * GTheory + 0,35* GPractice + 0,30 * 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 4,9 and the value obtained according to the above relation.

In addition, the following rules must be observed:

- A student who does not submit the report for the first practice will be considered to have chosen the Global Assessment modality. On the contrary, if he/she presents this report will be deemed to have opted for the Continuous Assessment modality (and he/she may not appear as "No Presented" in the transcripts). At the end of the first practice, the student will have chosen one of the modalities of assessment, not being able to change it subsequently.

- 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.

Global Assessment

Students who choose the Global Assessment 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 assessmente system is the harmonic mean of the scores obtained in the examination and in the project.

Extraordinary exam

The extraordinary exam will be governed by a procedure similar to the Global Assessment system. Thus, the student must submit a project and take a written exam. The final Mark is the harmonic mean. However, if the student had a score in the ordinary exam higher than 4 in the project (whether by continuous or global assessment system) he/she would not be required to submit a new project and he/she would keep the previous score. When submitting the project report and software, the valid score will always be the mark of the new submission. Similarly, if the student had a score higher than 4 in the theoretical part of the global assessment system or a score higher than 4 considering the unweighted arithmetic mean of GTheory and GPractice of the continuous assessment system, the student may waive the exam, in which case the score of the theoretical part would be the previously obtained (either the global assessment exam score or the unweighted arithmetic mean of GTheory and GPractice of the continuous assessment).

End-of-program exam

The end-of-program exam will be governed by a procedure similar to the Global Assessment system.

None of the marks obtained in the course will be retained for subsequent courses.

Plagiarism is regarded as serious dishonest behavior. If any form of plagiarism is detected in any of the tests or exams, the

final grade will be FAIL (0), and the incident will be reported to the corresponding academic authorities for prosecution.

Sources of information
Basic Bibliography
R. Baeza-Yates, B. Ribeiro-Neto, **Modern Information Retrieval. The concepts and technology behind search**, 2th Edition, Addison Wesley,
G. Antoniou, P. Groth, F. van Harmele, R. Hoekstra, **A Semantic Web Primer**, 3th Edition, MIT Press,
Complementary Bibliography
G. Shroff, **The Intelligent Web: Search, smart algorithms, and big data**, Oxford University Press,
W.B. Croft, D. Metzler, T. Strohman, **Search Engines: Information Retrieval in Practice**, Pearson,
J. Domingue, D. Fensel, J.A. Hendler, **Handbook of Semantic Web Technologies**, Springer,
S. Casteleyn, F. Daniel, P. Dolog, M. Matera, **Engineering Web Applications**, Springer,
J. Leskovec, A. Rajaraman, J. Ullman, **Mining of Massive Datasets**, Cambridge University Press,
R. Cailliau, J. Gillies, **How the Web was Born: The Story of the World Wide Web**, Oxford University Press, 2000
T. Berners-Lee, **The next web**, 2009

Recommendations