

**1. General information****Course:** WEB AND SERVICES ENGINEERING**Type:** ELECTIVE**Degree:** 346 - DEGREE IN COMPUTER SCIENCE AND ENGINEERING**Center:** 604 - SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (AB)**Year:** 4**Main language:** English**Use of additional languages:****Web site:****Code:** 42367**ECTS credits:** 6**Academic year:** 2019-20**Group(s):** 17**Duration:** First semester**Second language:****English Friendly:** N**Bilingual:** N**Lecturer:** RICARDO TESORIERO PSZYTULA - Group(s): 17

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2. Pre-Requisites

The Web Engineering and Services course requires knowledge related to the Rational Unified Process (RUP) and the Unified Modeling Language (UML). This knowledge can be acquired during the Software Engineering I course that is part of the Module I of the Computing Science degree curricula. Although it is not required, knowledge acquired during the Software Design and Software Engineering Processes courses that are part of the Software Engineering specialization of the Computing Science degree curricula are recommendable too.

Students should also have skills in HTML, CSS, XML and JSON markup languages. And, they also should have skills in Java and JavaScript programming languages. These skills can be acquired during Web System Technologies and Integration of Information Systems courses that are part of the Information Technology specialization offered in the Computer Science degree curricula.

3. Justification in the curriculum, relation to other subjects and to the profession

The Web is one of the most popular communication and content distribution platform in the world enabling users and applications to exchange information through the Internet. Web systems are defined as a set of distributed Web applications supported by a client-server architecture developed employing standard Web languages and technologies such as HTML, XML, CSS, JavaScript, etc.

Modern Web systems cover both Business-to-Client (B2C) as well as Business-to-Business (B2B) applications. While most of B2C applications are usually implemented as Graphical User Interfaces rendered in Web browsers using languages such as HTML, CSS, JS and so on; B2B applications are usually implemented as Web Application Programming Interfaces (APIs) implemented as Web services using languages such as XML, JSON, etc.

Suppose a Web system supporting an online shopping. While the Web application enabling clients to buy products is an example of a B2C Web application; the Web application that automatically requests products from the shopping provider when the product stock is under a threshold value is an example of a B2B Web application.

From the B2C applications' perspective, Web Services enable applications to move the Web page rendering from the server side of the application to the client side of the application improving Web application performance and flexibility. And, from the B2B applications' perspective, Web services enable users to share software applications and even platforms and infrastructures.

As we have mentioned, Web Services serve as a communication platform requiring protocols to exchange information. In order work properly and improve software reuse and maintenance, these protocols follow standards that are the basis of Service Oriented Architectures (SOAs) and Cloud Computing.

Due to the evolution of Web technologies and services during the last decade, the discipline of Web engineering has adapted and optimized development processes and methodologies to cope with the particularities of Web applications.

This course focuses on the development of Web systems using Web technologies and services following well-established Web engineering processes and methodologies.

4. Degree competences achieved in this course**Course competences**

Code	Description
INS1	Analysis, synthesis, and assessment skills.
IS3	Ability to solve problems of integration according to strategy functions, standards, and available technologies.
SI1	Ability to integrate information and communication technology solutions and entrepreneurial process so as to fulfil the needs for information in organisation, allowing them to meet their goals in an effective and efficient manner, providing them with competitive benefits.
SI2	Ability to determine the needs of information and communication systems in an organisation, following security aspects and complying with current laws and regulations.
UCLM1	Command of a second language at a B1 level within the Common European Framework of Reference for Languages

5. Objectives or Learning Outcomes**Course learning outcomes**

Description

Knowledge about how to apply the service-oriented paradigm for the construction of information systems, as well as the best related technologies to that paradigm.

Improvement of communication skills of the student in English language

Planning, modelling, development, assessment, and management of Web-based systems.

6. Units / Contents

Unit 1: Web engineering

Unit 1.1 Web application development process and modeling techniques

Unit 1.2 Web project management and scheduling

Unit 1.3 Web application quality management and auditory

Unit 1.4 Content management systems. Web application domains

Unit 2: Web development

Unit 2.1 Server side frameworks and applications

Unit 2.2 Client side frameworks and applications

Unit 3: Web service engineering

Unit 3.1 The service oriented paradigm

Unit 3.2 Service oriented organizations

Unit 3.3 Service oriented architectures

Unit 3.4 Advanced aspects on services

Unit 4: Web service development

Unit 4.1 Web service languages and protocols

Unit 4.2 Web service tools and technologies

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	R	Description
Class Attendance (theory) [ON-SITE]	Lectures	INS1 IS3 SI1 SI2 UCLM1	0.42	10.5	N	-	-	INDIVIDUAL
Workshops or seminars [ON-SITE]	Guided or supervised work	INS1 IS3 SI1 SI2 UCLM1	0.7	17.5	N	-	-	INDIVIDUAL
Individual tutoring sessions [ON-SITE]	Guided or supervised work	INS1 IS3 SI1 SI2 UCLM1	0.18	4.5	N	-	-	INDIVIDUAL
Other on-site activities [ON-SITE]	Assessment tests	INS1 IS3 SI1 SI2 UCLM1	0.1	2.5	N	-	-	INDIVIDUAL
Laboratory practice or sessions [ON-SITE]	Project/Problem Based Learning (PBL)	INS1 IS3 SI1 SI2 UCLM1	0.8	20	Y	Y	N	INDIVIDUAL
Study and Exam Preparation [OFF-SITE]	Self-study	INS1 IS3 SI1 SI2 UCLM1	1.5	37.5	N	-	-	INDIVIDUAL
Writing of reports or projects [OFF-SITE]	Reading and Analysis of Reviews and Articles	IS3 SI1 SI2	0.9	22.5	Y	N	N	INDIVIDUAL
On-line Activities [OFF-SITE]	Self-study	INS1 IS3 SI1 SI2	1.2	30	Y	N	N	INDIVIDUAL
Final test [ON-SITE]	Problem solving and exercises	INS1 IS3 SI1 SI2 UCLM1	0.2	5	Y	Y	N	INDIVIDUAL
Total:			6	150				
Total credits of in-class work: 2.4			Total class time hours: 60					
Total credits of out of class work: 3.6			Total hours of out of class work: 90					

As: Assessable training activity

Com: Training activity of compulsory overcoming

R: Rescheduling training activity

8. Evaluation criteria and Grading System

Evaluation System	Grading System		Description
	Face-to-Face	Self-Study Student	
Theoretical papers assessment	15.00%	0.00%	[INF] Presentation of a theoretical report. This evaluation is NOT MANDATORY, INDIVIDUAL, and NOT RECOVERABLE.
Assessment of problem solving and/or case studies	10.00%	0.00%	[PRES] Presence and seminar delivery This evaluation is NOT MANDATORY, INDIVIDUAL, and NOT RECOVERABLE.
Laboratory sessions	45.00%	0.00%	[LAB] Practice sessions in the laboratory. This evaluation is MANDATORY, INDIVIDUAL and NOT RECOVERABLE. The final practice score is the result of the weighted average of the partial scores of all practices. The score for each practice is obtained using the score table for the practice multiplied by the weight of the practice on the practice score. Students should get at least 5 out of 10 to pass the exam Practices MUST be evaluated BEFORE the last practice

			session.
Final test	30.00%	0.00%	[ESC] Multiple-choice questionnaire. This evaluation is MANDATORY, INDIVIDUAL and NOT RECOVERABLE. Students scores 1 point if the answer is correct, -0.5 points if the answer is not correct, and get no points if the question is not answered. Students should get at least 5 out of 10 to pass the exam
Total:	100.00%	0.00%	

Evaluation criteria for the final exam:

All activities are evaluated individually.

The MANDATORY activities to be evaluated are:

(A1) Final test (theoretical questionnaires) [30%] (scores from 0 to 10, requiring at least 5 to pass)

(A2) Laboratory practices (execution and evaluation) [45%] (scores from 0 to 10, requiring at least 5 to pass)

Students that do not pass all MANDATORY evaluations get a score that is NOT higher than 4 out of 10, even if the average of all evaluations are higher than 5.

It means that students must score at least 5 out of 10 in BOTH MANDATORY exams to pass.

The optional activities to be evaluated are:

(A3) Theoretical report (report) [15%] (scores from 0 to 10)

(A4) Attendance to seminars (delivery of seminar results) [10%] (scores from 0 to 10)

Laboratory practice examination is performed INDIVIDUALLY during MUST be evaluated BEFORE the LAST practice session.

Specifications for the resit/retake exam:

Same as final exam.

Practice examination is performed INDIVIDUALLY.

Students MUST schedule a meeting to evaluate Practice activities at least ONE WEEK BEFORE the first resit/retake exam.

Specifications for the second resit / retake exam:

Same as first resit/retake exam.

Practice examination is performed INDIVIDUALLY.

Students MUST schedule a meeting to evaluate Practice activities at least ONE WEEK BEFORE the second resit/retake exam.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
General comments about the planning: The subject is taught in three weekly sessions of 1.5 hours. This planning is ORIENTATIVE, and may vary throughout the course depending on the teaching needs, holidays, or for any other unforeseen cause. The weekly planning of the subject can be found in detail and updated on the Virtual Campus platform (Moodle). Class evaluation or recovery activities could be planned, exceptionally, in the mornings.	
Unit 1 (de 4): Web engineering	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Workshops or seminars [PRESENCIAL][Guided or supervised work]	12.25
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	3.15
Other on-site activities [PRESENCIAL][Assessment tests]	1.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	26.25
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	15.75
On-line Activities [AUTÓNOMA][Self-study]	15
Final test [PRESENCIAL][Problem solving and exercises]	1
Comment: The subject is taught in three weekly sessions of 1.5 hours. This planning is ORIENTATIVE, and may vary throughout the course depending on the teaching needs, holidays, or for any other unforeseen cause. The weekly planning of the subject can be found in detail and updated on the Virtual Campus platform (Moodle). Class evaluation or recovery activities could be planned, exceptionally, in the mornings.	
Unit 2 (de 4): Web development	
Activities	Hours
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	12
On-line Activities [AUTÓNOMA][Self-study]	6
Final test [PRESENCIAL][Problem solving and exercises]	1.5
Unit 3 (de 4): Web service engineering	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	3.5
Workshops or seminars [PRESENCIAL][Guided or supervised work]	5.25
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	1.35
Other on-site activities [PRESENCIAL][Assessment tests]	.75
Study and Exam Preparation [AUTÓNOMA][Self-study]	11.25
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	6.75
On-line Activities [AUTÓNOMA][Self-study]	6
Final test [PRESENCIAL][Problem solving and exercises]	1
Unit 4 (de 4): Web service development	
Activities	Hours
Other on-site activities [PRESENCIAL][Assessment tests]	3

Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	8
Final test [PRESENCIAL][Problem solving and exercises]	1.5
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	10.5
Individual tutoring sessions [PRESENCIAL][Guided or supervised work]	4.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	37.5
On-line Activities [AUTÓNOMA][Self-study]	27
Workshops or seminars [PRESENCIAL][Guided or supervised work]	17.5
Other on-site activities [PRESENCIAL][Assessment tests]	5.5
Writing of reports or projects [AUTÓNOMA][Reading and Analysis of Reviews and Articles]	42.5
Final test [PRESENCIAL][Problem solving and exercises]	5
Total horas: 150	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Leonard Richardson, Sam Ruby	RESTful Web Services	O'Reily		978-0596529260	2007	
Roger Pressman, Bruce Maxim	Web Engineering: A Practitioner's Approach (8th edition)	McGraw-Hill		978-0078022128	2014	
Gerti Kappel, Birgit Proll, Siegfried Reich, Werner Retschitzegger	Web Engineering: The Discipline of Systematic Development of Web Applications	Wiley		978-0470015544	2006	