



IDENTIFYING DATA

Computer Systems

Subject	Computer Systems			
Code	P52M182V01305			
Study programme	Master Universitario en Dirección TIC para la defensa			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Optional	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	González Coma, José Pablo			
Lecturers	González Coma, José Pablo			
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General description	This matter pursues to endow the students with training on the fundamental concepts associated with the architecture, design, administration, analysis, monitoring and deployment of computer infrastructures advanced as clusters of computation, systems virtualized, computation in the cloud, systems of high integrity, systems of real-time and systems bedded.			
	The lesson of the classroom will use for the introduction of the theoretical concepts, which will complement works of investigation that allow deepening in concrete topics.			

Training and Learning Results

Code	
A6	CB6 - Possess and understand knowledge that provides a basis or opportunity to be original in the development and / or application of ideas, often in a research context.
A7	CB7 - That students know how to apply the acquired knowledge and their ability to solve problems in new or poorly understood environments within broader (or multidisciplinary) contexts related to their area of study.
A8	CB8 - That students are able to integrate knowledge and face the complexity of formulating judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
A9	CB9 - That students know how to communicate their conclusions and the knowledge and ultimate reasons that support them to a specialized and unspecialized public in a clear and unambiguous way.
A10	CB10 - That students possess the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.
B1	CG1 - Possess advanced and highly specialized knowledge and demonstrate a detailed and well-founded understanding of the theoretical and practical aspects dealt with in the different areas of study.
B2	CG2 - Integrate and apply the knowledge acquired, and possess the ability to solve problems in new or imprecisely defined environments, including multidisciplinary contexts related to their field of study.
C15	CIST11 - Define and implement different computing systems in line with technological evolution and deployment environments.
D4	CT4 - Oral and written communication skills.
D5	CT5 - Autonomous learning and work.

Expected results from this subject

Expected results from this subject	Training and Learning Results
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RA1 - Know the fundamental concepts associated with the architecture, design, administration, and deployment of computer infrastructures advanced, like clusters of computation, systems of high integrity, systems virtualized, and computation in the cloud.	A6 A7 A8 A9 A10 B1 B2 C15 D4 D5
RA2 - Be able to analyze the performance of computer systems.	A6 A7 A8 A9 A10 B1 B2 C15 D4 D5
RA3 - Know the main concepts related to the design and implementation of hardware and software computer systems with specific requirements, such as embedded systems and real-time systems.	A6 A7 A8 A9 A10 B1 B2 C15 D4 D5

Contents

Topic	
Introduction to computation	- Introduction to computation - Historical development - Algorithms and computational theory - Architecture of a computer - Scheduling
Parameters of quality and analysis of the performance of systems	- Characteristics of the computers - Analysis of performance
Computation cluster	- Types of clusters - Components of a cluster
Virtualization	- Mechanisms of virtualization - Types of hypervisors - Advantages of virtualization
Cloud computing	- Models of reference - Types of deployments - Products and providers - Advantages and inconvenients
Fault-tolerant and high-integrity systems	- Introduction: reliability, faults, failures, and errors - Prevention of failures - Tolerance of failures - Redundancy
Architectures for real-time	- Types of systems - Architectures hardware - Architectures software - Operating systems for real-time
Embedded systems	- Characteristic of the embedded system - Architectures - Platforms

Planning

	Class hours	Hours outside the classroom	Total hours
Previous studies	0	25	25
Lecturing	8	8	16
Seminars	1	0	1

Discussion Forum	0	5	5
Presentation	6	0	6
Objective questions exam	2	0	2
Essay	0	20	20

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

Methodologies	
	Description
Previous studies	Research, reading, work of documentation and/or realization of the autonomous form of any other activity that the student considers necessary to allow him the acquisition of knowledge and skills related to the matter. It is used to carry out prior to the classes, practices of laboratory and/or proofs of evaluation.
Lecturing	Exposition by part of a professor of the contents of the topics to be studied, theoretical bases and/or guidelines of a work or exercise that the student has to develop.
Seminars	Activity focused to the work on a specific subject, that allows to deepen or complement in the contents of the matter.
Discussion Forum	Activity developed in some virtual surroundings in which debate on diverse topics or current developments related to the subject.

Personalized assistance

Methodologies	Description
Lecturing	Will carry out by means of the use of telematic means. The students that wish it will be able to pose doubts to the professors in forums or by means of email. Also, they will be able to concert individual sessions with the professor, which will develop by means of videoconference.
Seminars	Although it keeps on being possible the use of telematic mechanisms of attention to the student, in this case, will employ also mechanisms of mentoring face-to-face.

Assessment						
	Description	Qualification	Training and Learning Results			
Presentation	Exhibition by part of the students, in an individual way or in the group, of a subject related to the contents of the matter or of the results of a work, exercise, project, etc. Through the presentation can evaluate knowledge, skills, and aptitudes. There will be 2 presentations (P1 and P2) that will be evaluated during the face-to-face phase: P1 will cover the 4 first subjects of the subject and P2 will cover the 4 following subjects.	20	A6 A7 A8 A9 A10	B1 B2	C15	D4 D5
Objective questions exam	Proof that evaluates the knowledge and that includes enclosed questions with different alternative answers (true or false, multiple elections, the pairing of elements, etc.). The students/ace select an answer from among a number limited of possibilities. It will consist in a written exam (PE) at the end of the in-person stage, in which all the contents of the subject will be assessed (including the contents of the phase to distance and the face-to-face)	40	A6 A7 A8 A9 A10	B1 B2	C15	D4 D5
Essay	Text or document elaborated on a subject that has to draft following some norms established of style and length. It allows us to evaluate the skills, the knowledge, and, in lower measure, the aptitudes of the student. There will be 2 works (T1 and T2) that will be evaluated during the online stage: T1 will cover the 4 first subjects of the subject and T2 will cover the 4 following subjects.	40	A6 A7 A8 A9 A10	B1 B2	C15	D4 D5

Other comments on the Evaluation

It is necessary to reach 50% of the mark in order to pass the course.

A continuous evaluation mechanism will be used, which it is intended to monitor the student's progress throughout the course, assessing their effort globally. Denoted as EV_CON, the continuous evaluation mark is calculated as follows:

$$EV_CON = 0.2 \cdot T1 + 0.1 \cdot P1 + 0.2 \cdot T2 + 0.1 \cdot P2 + 0.4 \cdot PE.$$

In case the student fails to pass the course in the ordinary call, he/she will have the right to a second evaluation opportunity (extraordinary call) that will take place in the distance mode on the dates established for that purpose by the Master's Academic Committee. The evaluation will consist in that case in a single written test that will account for 100% of the grade, being necessary to obtain at least 50% to pass the subject.

ACADEMIC INTEGRITY:

Students are expected to show adequate ethical behaviour, committing to act honestly. Based on article 42.1 of

the Regulation on the evaluation, qualification and quality of teaching and the student learning process of the University of Vigo, **any violation of academic integrity in the assessment process, as well as the cooperation in it will result in the assignment of a failing grade to the student (zero) for the entire course in the corresponding assessment opportunity**, regardless of the percentage of importance that the test in question had in the overall continuous assessment and independently of other disciplinary actions that may be applied.

In case of any difference between the guides in Galician/Spanish/English related to the evaluation, what is indicated in the teaching guide in Spanish will always prevail.

Sources of information

Basic Bibliography

Complementary Bibliography

Buyya, Rajkumar, Christian Vecchiola, y S. Thamarai Selvi., **Mastering cloud computing: foundations and applications programming.**, ISBN: 978-0124114548, 1ª Ed., Newnes, 2013

Rauber, Thomas, y Gudula Rünger, **Parallel programming: For multicore and cluster systems.**, ISBN: 978-3642378003, 2ª Ed., Springer Science & Business Media, 2013

Wolf, Marilyn, **Computers as components: principles of embedded computing system design**, ISBN: 978-0123884367, 3ª Ed., Elsevier, 2012

Joyanes Aguilar, Luis, **Computación en la Nube: estrategias de cloud computing en las empresas**, ISBN: 978-8426718938, 1ª Ed., Marcombo, 2012

Recommendations

Other comments

Students are encouraged to have basic knowledge of the operation of computer systems before starting this course.