Universida de Vigo

IDENTIFYING DATA
Planning and management of ICT infrastructures

Subject	Planning and management of ICT infrastructures				
Code	P52M182V01203				
Study programme	Master Universitario en Dirección TIC para la defensa				
Descriptors	ECTS Credits		Choose	Year	Quadmester
	4		Mandatory	1st	2nd
Teaching language	Spanish				
Department					
Coordinator	Fernández Gavilanes, Milagros				
Lecturers	Fernández Gavilanes, Milagros Suarez Lorenzo, Fernando				
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Web	http://campus.defensa.gob.es | https://moovi.uvigo.gal				
General description	This course enables students to learn the knowledge and application of the processes required to manage an ICT infrastructure aligned with business requirements. Define the processes, interfaces and dependencies associated with the ICT infrastructure management lifecycle, including strategic planning, design, implementation, operations, support and maintenance. Knowledge of project organisation and management will be acquired to complement knowledge of system and network integration, storage systems, parallel architectures and basic IT installation environments. In this subject, these concepts and their application in business environments will be studied and the student will be able to make strategic decisions that integrate them.				

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.
B3	CG3 - Direct, plan, coordinate, organize and/or supervise tasks, projects and/or human groups. Work cooperatively in multidisciplinary teams acting, where appropriate, as an integrator of knowledge and lines of work.
B6	CG6 - Be able to make decisions in environments characterized by complexity and uncertainty, evaluating the different existing alternatives in order to select the one with the most favorable expected result, appropriately managing the risk associated with the decision.
C6	CE6 - Plan and manage ICT infrastructures.
D3	CT3 - Incorporate criteria of sustainability and environmental commitment into professional practice. Acquire skills in the equitable, responsible and efficient use of resources.

D4   CT4 - Oral and written communication skills.

Expected results from this subject

Expected results from this subject	Training and Learning Results
LO1: Know how to implement, configure and maintain virtualisation services on servers.	A6 A7 A8 B1 B2 B3 B6 C6 D3 D4
LO2: Understand the main architectures of high availability systems.	A6 B1 B2 B3 B6 C6 D3 D4
LO3: Know how to implement and configure high availability systems based on standard servers.	A6 A7 A8 A9 B1 B2 B3 B6 C6 D3 D4
LO4: To know the basics of hardware planning in large installations, as well as its integration with communications systems.	A7 A8 A9 B1 B2 B3 B6 C6 D3 D4
LO5: Know how to deal with the management of large system infrastructures	A6 A8 A10 B1 B2 B3 B6 C6 D3 D4
LO6: To learn about real examples of large ICT infrastructures in companies and/or administrations.	A7 A9 A10 B1 B2 B3 B6 C6 D3 D4

Expected results from this subject	

LO7: Saber aplicar eficientemente un soporte de comunicaciones a una infraestructura hardware

A6
A8
B1
B2
B3
B6
C6
D3
D4

Contents

Topic	
Topic 1: Introduction to large ICT infrastructures.	1.1. Introduction to Data Centers. 1.2. Usual structure 1.3. Data Centers Administration
Topic 2: Infrastructure planning.	2.1. Elements and physical organization of a CPD. 2.2. Design requirements and regulations. 2.3. Elements and devices for network management.
Topic 3: Communications infrastructure.	3.1. Communications networks: topologies, protocols, connection elements. 3.2. Network security: VPN and Firewalling.
Topic 4: Management and Planning of Virtualized Resources.	4.1. High availability: load balancing, distributed computing and clustering. 4.2. Virtualization.
Topic 5: Cloud Computing.	5.1. Introduction to Cloud Computing. 5.2. Tools. 5.3. OpenStack and vCloud.
Topic 6: Storage systems.	6.1. Storage networks: topologies, protocols, connection elements. 6.2. Storage systems: architectures and components. 6.3. Backups.
Topic 7: Infrastructure management, monitoring and control	7.1. CPD monitoring. 7.2. Evaluation and performance measures. 7.3. Asset management.

Planning

	Class hours	Hours outside the classroom	Total hours
Autonomous problem solving	0	8	8
Previous studies	0	53	53
Lecturing	8	8	16
Problem solving	2	2	4
Studies excursion	4	0	4
Seminars	3	0	3
Discussion Forum	0	4	4
Self-assessment	0	3	3
Presentation	3	0	3
Objective questions exam	2	0	2

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

Methodologies

	Description
Autonomous problem solving	Activity in which students analyse and solve problems and/or exercises related to the subject in an autonomous way.
Previous studies	Research, reading, documentation work and/or autonomously carrying out any other activity that the student considers necessary to enable him/her to acquire knowledge and skills related to the subject. This is usually carried out prior to the classes, laboratory practices and/or assessment tests.
Lecturing	Lecturer's presentation of the contents of the subject being studied, theoretical bases and/or guidelines for a project or exercise to be carried out by the student.
Problem solving	Activity in which problems and/or exercises related to the subject are formulated. The student must develop the appropriate and correct solutions through the exercise of routines, application of formulas or algorithms, application of transformation procedures of the available information and interpretation of the results.
Studies excursion	Activities involving the application of knowledge in a specific context in an external space (research centre, laboratory, museum, institution, company, etc.) of academic-professional interest to students.

Seminars	Activity focused on working on a specific topic, which allows to deepen or complement the contents of the subject.
Discussion Forum	An activity carried out in a virtual environment in which a variety of current topics related to the academic and/or professional sphere are debated.

Personalized assistance

Methodologies	Description
Lecturing	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the teacher in forums or by e-mail. They will also be able to arrange individual tutorials with the lecturer, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Problem solving	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the lecturer in forums or by e-mail. They will also be able to arrange individual tutorials with the teacher, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Studies excursion	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the lecturer in forums or by e-mail. They will also be able to arrange individual tutorials with the teacher, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.
Seminars	It will be carried out through the use of telematics systems. Students who wish to do so will be able to ask questions to the lecturer in forums or by e-mail. They will also be able to arrange individual tutorials with the teacher, which will take place via videoconference. While the use of telematics student support is still possible, face-to-face tutoring mechanisms will also be used during this phase.

Assessment

	Description	Qualification	Training and Learning Results			
Discussion Forum	An activity carried out in a virtual environment in which a variety of current topics related to the academic and/or professional sphere are debated. It allows the evaluation of the student's skills, knowledge and, to a lesser extent, attitudes. Participation in the forums will be assessed. This discussion forum activity (F) will be carried out during the distance phase.	20	A6 A7 A8 A10	B1 B2 B6	C6	D4
Self-assessment	A mechanism in which, by means of a series of questions or activities, the student is able to autonomously assess his/her degree of acquisition of knowledge and skills on the subject, allowing self-regulation of the personal learning process. This self-assessment activity (SA) will be carried out during the distance learning phase.	20	A7	B1	C6	D3
Presentation	Presentation by the students, individually or in groups, of a topic related to the contents of the subject or the results of a work, exercise, project, etc. Through the presentation, knowledge, skills and attitudes can be assessed. This presentation activity (P) will be carried out during the face-to-face phase.	30	A6 A7 A8 A9	B1 B2 B3 B6	C6	D4
Objective questions exam	A test that assesses knowledge and includes closed questions with different answer alternatives (true or false, multiple choice, item matching, etc.). Students select an answer from a limited number of possibilities. This developmental questions (E) examination activity will be carried out during the face-to-face phase.	30	A6 A7 A8 A9	B1 B2 B3 B6	C6	D3 D4

Other comments on the Evaluation

If we call the average continuous assessment mark MED_CON, which is calculated as:

MED_CON = 0.2*F + 0.2*AV+ 0.3*P + 0.3*ED

It will be necessary to achieve 50% of the grade in order to pass the course.

In the event that the student does not manage to pass the subject in the ordinary call, he/she will have the right to a second opportunity for assessment (extraordinary call) which will be carried out in distance mode on the dates established for this purpose by the Master's Academic Committee. In the case of the evaluation in the extraordinary call, the weight will be divided 50/50 between the written test and the presentation of the final work of the subject. It will be necessary to achieve at least 50% of the grade in order to pass the course.

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 the event that there is 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
Stephen R Smoot, Nam K Tan, **Private Cloud Computing: Consolidation, Virtualization, and Service-Oriented Infrastructure**, 1, Morgan Kaufmann, 2011
Maurizio Portolani, **Data Center Fundamentals**, CiscoPress, 2003
Complementary Bibliography
Christopher Poelker, Alex Nikitin, **Storage Area Networks for Dummies**, 2, John Wiley & Sons Inc, 2008
Josep Ros, **Virtualización Corporativa con VMware**, 2011
J. María González, **Descubre y domina Vmware Vsphere**, Lexington, 2011

Recommendations

Other comments
A visit to a Data Processing Centre would be desirable in order to visualise the knowledge acquired throughout the course.