Teaching Guide

Identifying Data				2020/21	
Subject (*)	Infrastructure Management			Code	614G01025
Study programme	Grao en Enxeñaría Informática				

Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	Third		Obligatory	6
Language	SpanishGalician				
Teaching method	Hybrid				
Prerequisites					
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputaciónEnxeñaría de Computadores				
Coordinador	Carneiro Diaz, Victor Manuel		E-mail	victor.carneiro@udc.es	
Lecturers	Carneiro Diaz, Victor Manuel		E-mail	victor.carneiro@udc.es	
	Castedo Ribas, Luis			luis.castedo@udc.es	
	Dafonte Vazquez, Jose Carlos			carlos.dafonte@udc.es	
	Dapena Janeiro, Adriana			adriana.dapena@udc.es	
	Iglesia Iglesias, Daniel Ismael			daniel.iglesia@udc.es	
	Martinez Perez, Maria			maria.martinez@udc.es	
	Montoto Castelao, Paula			paula.montoto@udc.es	
	Pérez Adán, Darian			d.adan@udc.es	
Web					
General description	This subject consists of two differentiated modules. In the first part of the subject or module I, the student is introduced to the physical characteristics of telecommunications infrastructures, both for wired and wireless networks. The fundamental concepts of data transmission such as bandwidth, frequency response, modulation, transmission speed among others are explained. In the second part or module II, it introduces the student to the basic concepts of design, deployment, operation and maintenance of a data processing center (CPD). It includes the fundamentals of physical space design for its location, tools and techniques for wiring design, power supply systems, air conditioning, access control, and surveillance systems. Virtualization of the CPD infrastructure, both server and client, is also addressed. The traditional organization and operation of a CPD is studied. Finally, the study of the regulations that affect this instalations.				
Contingency plan	If it is not possible to do the teaching in person or in a hybrid way, the contents and the recommended bibliography will not be altered. For personalized attention, the telematic methods provided in the corresponding section of this guide will be followed. The master sessions provided in the teaching methodology section will be covered by the provision in the stream tool. During the master classes, the teacher will remain connected, through Team, to clarify the concepts presented in the videos and clarify any questions. The realization of the practices will be carried out remotely through the continuous tutoring of the teacher, who will use the means described in the personalized attention section for this purpose. Telematic means will be enabled for delivery and defense. Both the objective test and the short answer tests will be carried out through the remote training tool. Neither will the assessment and the percentages specified in the corresponding section of this guide be modified.				

Study programme competences	
Code	Study programme competences

A7	Capacidade para deseñar, desenvolver, seleccionar e avaliar aplicacións e sistemas informáticos que aseguren a súa fiabilidade, seguranza e calidade, conforme a principios éticos e á lexislación e normativa vixente.
A10	Capacidade para elaborar o prego de condicións técnicas dunha instalación informática que cumpra os estándares e as normativas vixentes.
A11	Coñecemento, administración e mantemento de sistemas, servizos e aplicacións informáticas.
A24	Coñecemento da normativa e a regulación da informática nos ámbitos nacional, europeo e internacional.
A37	Capacidade para analizar, avaliar, seleccionar e configurar plataformas hárdware para o desenvolvemento e execución de aplicacións e servizos informáticos.
A38	Capacidade para deseñar, despregar, administrar e xestionar redes de computadores.
A47	Capacidade para determinar os requisitos dos sistemas de información e comunicación dunha organización de acordo cos aspectos de seguridade e cumprimento da normativa e a lexislación vixente.
A48	Capacidade para participar activamente na especificación, deseño, implementación e mantemento dos sistemas de información e comunicación.
A53	Capacidade para seleccionar, deseñar, despregar, integrar, avaliar, construír, xestionar, explotar e manter as tecnoloxías de hárdware, sóftware e redes dentro dos parámetros de custo e calidade adecuados.
A55	Capacidade para seleccionar, deseñar, despregar, integrar e xestionar redes e infraestruturas de comunicacións nunha organización.
B1	Capacidade de resolución de problemas
B3	Capacidade de análise e síntese
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences		
Know and be able to apply the regulations and legislation in force regarding computer systems. Preparation of administrative and technical specifications for the acquisition of computer equipment.	A7 A10 A24 A37 A38 A47 A48 A53 A55	B1 B3	C2 C3 C6 C8
Administration, maintenance and operation of communication systems and networks.	A7 A10 A11 A24 A37 A38 A47 A48 A53 A55	B1 B3	C2 C3 C6 C8

Design and dimensioning of the necessary hardware and equipment in a data processing center.	A7 A10 A11 A24 A37 A38 A47 A48 A53 A55	B1 B3	C2 C3 C6 C8

Contents	
Topic	Sub-topic
Representation of signals in the time domain	Signal concepts Basic signals Sine signals Basic signal operations Convolution
Frequency analysis of signals and systems	Fourier transform concept Properties of the Fourier Transform Frequency modulation and multiplexing Filtered out
Comunication systems	Digitization Digital communication systems
Information Security Management System	Information security audit Information Security Management System (ISMS) ISO 27001 ISO 27002
Customer infrastructure management	Customer equipment management: centralized / distributed Remote boot: standards and transmission methods Cloning techniques through the data network
Organization and operation of the CPD	Organization CPD Functions and competencies of the staff Internal and external incident management (ITIL) Documentation Computer waste treatment
Design and implementation of a data processing center	Design of a CDP (ANSI / TIA 942). Local area network (LAN) technologies Storage Networks (SAN)

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
ICT practicals	A55 A53 A48 A47 A38 A37 A24 A11 A10 A7 B1 B3 C2 C3 C6 C8	20	70	90

Objective test	A55 A53 A48 A47 A38 A37 A24 A11 A10 A7 B1 B3 C2 C3 C6 C8	3	0	3
Short answer questions	A37 B1 B3	1	0	1
Guest lecture / keynote speech	A55 A53 A48 A47 A38 A37 A24 A11 A10 A7 B1 B3 C2 C3 C6 C8	19	30	49
Personalized attention		7	0	7
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
ICT practicals	In which the student will see the operation in practice of some of the theoretical content seen in the master classes. In these practices the student will use different tools proposed by the teacher that will allow them to deepen and consolidate their knowledge on different aspects of infrastructure management. The practices will be planned in a way that facilitates their semi-face-to-face realization for those students who cannot attend the face-to-face sessions. In addition to the basic practices that all students will have to do, additional practices are proposed that interested students can optionally do.
Objective test	Test at the end of the semester.
Short answer questions	Short problem solving tests and answers to questions about the methodology and practice sections.
Guest lecture / keynote speech	In which the theoretical content of the agenda will be exposed, including illustrative examples and with the support of audiovisual media. The student will have the support material (notes, copies of the transparencies, articles, etc.) in advance and the teacher will promote an active attitude, recommending the prior reading of the agenda items to be dealt with in each class, as well as asking questions that allow clarifying specific aspects and leaving questions open for student reflection.

Personalized attention	
Methodologies	**Description**
Guest lecture / keynote speech ICT practicals Short answer questions	Students will be recommended to attend tutoring as a fundamental part of learning support. The personalized attention during the practices will serve to guide and verify the work that the students are doing according to the indications that are provided, depending on the specific practice in question. As telematic tools for personalized online attention, those provided by the University of A Coruña will be used. Email, e-learning tool (moodle) and video conferencing and teamwork tool (Teams).

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**

ICT practicals	A55 A53 A48 A47 A38 A37 A24 A11 A10 A7 B1 B3 C2 C3 C6 C8	[Module I] The ICT practices of topics 1 to 3 will be evaluated through a written test that will have a weight of 1 point. At the first opportunity, it will be done during the last theory class. In the second opportunity, the date will be after the theory exam. [Module II] The compulsory module II practices will add 1 point and will be evaluated before the theoretical exam, by defending the work done in front of the practical teacher either in person or online. At the second opportunity, the defense date may not be later than the theory exam and the form of defense will be the same as for the first opportunity.	20
Objective test	A55 A53 A48 A47 A38 A37 A24 A11 A10 A7 B1 B3 C2 C3 C6 C8	[Module I] The master sessions for topics 1 to 3 will be evaluated by means of a written test on the date set in the exam calendar. It will have a weight of 3 points. [Module II] The evaluation of topics 4 to 7 will also be carried out through a written test, which will be held together with that of [Module I]. In addition to the contents developed in the magisterial sessions, within this test questions about the practices may be included. This exam will add 3 points.	60
Short answer questions	A37 B1 B3	[Módulo I] Varias pruebas cortas que consistirán en resolver un problema similar a los realizados en clase. Se resolverán utilizando moodle en varias clases de teoría. Tendrá un peso de 1 punto. [Módulo II] En lo relativo al módulo II, esta prueba se realizará de forma oral, frente al profesor, mediante la respuesta a las preguntas que se formulan sobre la metodología y desarrollo de las distintas secciones de la práctica. Tendrá un peso de 1 punto.	20

Assessment comments

The grade of each module is the result of the sum of the grades of all the evaluations (there is no minimum for each section) and must be equal to or greater than 2 points out of 5 in both modules in order to pass the subject. In case of not passing any of the two modules, the maximum grade that will be reflected in the minutes is 4 out of 10 points.

Both in the first opportunity and in the second, the student will be able to examine themselves in any of the theoretical or practical sections of each of the modules (or both).

In the second opportunity, students who obtained the SUSPENSE qualification in the first opportunity will be able to appear. The following considerations will be taken into account:

* Master Session: it is only necessary to appear in the module in which a grade of less than 2.5 points out of 5 points was obtained at the first opportunity.

* Practices through ICT: students who take the "objective test" at the second opportunity, may choose to keep the mark of practices through ICT at the first opportunity to take a new test.

* Short answer test: The note of the first opportunity will be kept.

Extraordinary calls:

Exam of theoretical, practical and problem contents: 10 points

Part-time students:

Students with part-time enrollment do not require attendance and the evaluation of the theoretical contents can be carried out with a single attendance to carry out the objective test on the date indicated in the exam calendar.

Sources of information

Basic	- A. V. Oppenheim, A. S. Willsky (1997). Signals and Systems. Prentice-Hall
	- J. Kurose, K. Ross (2017). Computer Networking: A Top-Down Approach. Pearson Education Limited
	- Maurizio Portolani (2003). Data Center Fundamentals. CiscoPress
	- Charles E. Spurgeon (2000). Ethernet: The Definitive Guide. O'Reilly
	- Christian F Nissen (2012). Passing Your ITIL Foundation Exam. The Stationery Office
	- Brady Orand (2009). Foundations of IT Service management with ITIL 2011. CreateSpace Independent Publishing Platform
	- Varios (2011). IT Infrastructure Library (serie de 5 libros). The Stationery Office
	- Luis Gómez, Ana Andrés (2012). Guía de aplicación de la Norma UNE-ISO/IEC 27001 sobre seguridad en sistemas de información para pymes. AENOR
	- C. M. Fernández, M. Piattini (2012). Modelo para el gobierno de las TIC basado en las normas ISO. AENOR
	- Nextel S.A. (2012). ISO/IEC 20000 para pymes. Cómo implantar un sistema de gestión de los servicios de tecnologías de la información. AENOR
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Electronics Technology/614G01005
Databases/614G01013
Operating Systems/614G01016
Networks/614G01017
Subjects that are recommended to be taken simultaneously
Internet and Distributed Systems/614G01023
Computer Security and Legislation/614G01024
Subjects that continue the syllabus
Hardware Devices and Interfaces/614G01032
Communications Software/614G01034
Digital Information Processing/614G01035
Mobile and Wireless Networks/614G01061
Network Administration/614G01213
Other comments