# UNIVERSIDADE DA CORUÑA

| **Teaching Guide** | | | | |
|---|---|---|---|---|
| **Identifying Data** | | | | **2021/22** |
| **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** | Face-to-face | | | |
| **Prerequisites** | | | | |
| **Department** | Ciencias da Computación e Tecnoloxías da InformaciónComputaciónEnxeñaría de Computadores | | | |
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| **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.<br><br>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.<br><br>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.<br><br>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.<br><br>Both the objective test and the short answer tests will be carried out through the remote training tool.<br><br>Neither will the assessment and the percentages specified in the corresponding section of this guide be modified. | | | |

| **Study programme competences / results** | |
|---|---|
| **Code** | **Study programme competences / results** |

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

| Planning | | | | |
|---|---|---|---|---|
| **Methodologies / tests** | **Competencies / Results** | **Teaching hours (in-person & virtual)** | **Student?s personal work hours** | **Total hours** |
| ICT practicals | A7 A10 A11 A24 A37 A38 A47 A48 A53 A55 B1 B3 C2 C3 C6 C8 | 30 | 40 | 70 |

| | | | | |
|---|---|---|---|---|
| Objective test | A7 A10 A11 A24 A37 A38 A47 A48 A53 A55 B1 B3 C2 C3 C6 C8 | 3 | 0 | 3 |
| Guest lecture / keynote speech | A7 A10 A11 A24 A37 A38 A47 A48 A53 A55 B1 B3 C2 C3 C6 C8 | 30 | 40 | 70 |
| 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. |
| 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 | 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 / Results** | **Description** | **Qualification** |
| ICT practicals | A7 A10 A11 A24 A37 A38 A47 A48 A53 A55 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 | A7 A10 A11 A24 A37 A38 A47 A48 A53 A55 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.<br><br>[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. | 80 |
| --- | --- | --- | --- |

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

| Recommendations |
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| Subjects that it is recommended to have taken before |
| Electronics Technology/614G01005<br>Databases/614G01013<br>Operating Systems/614G01016<br>Networks/614G01017 |

| Subjects that are recommended to be taken simultaneously |
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| 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** |
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