IDENTIFYING DATA

Networks and telecommunication systems

Subject	Networks and telecommunication systems			
Code	P52M182V01104			
Study programme	Master Universitario en Dirección TIC para la defensa			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	3	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Troncoso Pastoriza, Francisco Manuel			
Lecturers	Fernández Gavilanes, Milagros Troncoso Pastoriza, Francisco Manuel			
E-mail	ftroncoso@cud.uvigo.es			
Web	http://campus.defensa.gob.es | https://moovi.uvigo.gal			
General description	This subject provides fundamental concepts of communication networks and telematic services: the technological basis of data transmission, the architecture of communication networks and services, the main components of ICT infrastructures, network management and planning methods and the basic aspects of security in computer networks. Classroom lectures will be used for the introduction of theoretical concepts, which will be complemented with various laboratory practices.			

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.
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.
C7	CE7 - Analyze and model the architecture of a communications system, including its different components and access, transport and transmission services, both in local and wide-area environments.
D4	CT4 - Oral and written communication skills.

Expected results from this subject

Expected results from this subject	Training and Learning Results

LO1: Know the technological basis on which telematics and data transmission are based.	A6 A7 A8 A9 A10 B1 B3 B6 C7 D4
LO2: Understand the basic principles and architectures of communication networks and services.	A6 A7 A8 A9 A10 B1 B3 B6 C7
LO3: Know the main components of ICT infrastructures.	A6 A7 A8 A9 A10 B1 B3 B6 C7 D4
LO4: Know the methods of network management and planning.	A6 A7 A8 A9 A10 C7 D4
LO5: Know military communication systems.	A6 A7 A8 A9 A10 C7 D4

Contents

Topic	
Block I: Introduction to computer networks	- Objectives and motivation - Use of computer networks, social and economic impact - Components of computer networks and types of networks - Connections and routing - Layers, services and protocols - Reference models (OSI/Internet) - History of the Internet
Block II: Computer network management	- Objectives and motivation - Network design and planning: sub-networks, demilitarised zones, VLANs and NAT. - Network monitoring and management: network access control, virtualisation and network management (fault, configuration, account, performance, security, and SNMP)
Block III: Computer network architecture	- Architecture and components of telecommunication systems: introduction, addressing, performance, security - Transmission media (spectrum, frequency bands): introduction, frequencies and spectrum, channel characterisation, transmission media - Military communication equipment and systems: introduction, rugerisation, military networks

Planning

	Class hours	Hours outside the classroom	Total hours
Previous studies	0	38	38
Lecturing	8	8	16
Problem solving	0	2	2
Seminars	1	0	1
Practices through ICT	5	0	5
Autonomous problem solving	0	4	4
Discussion Forum	0	1	1
Self-assessment	0	3	3
Essay	0	2	2
Presentation	2	0	2
Objective questions exam	1	0	1

*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, documentation work and/or autonomous performance of any other activity that the student considers necessary to enable him to acquire knowledge and skills related to the subject. This is usually carried out prior to classes, laboratory practices and/or assessment tests.
Lecturing	Presentation by the lecturer of the contents of the subject, theoretical bases and/or guidelines of a work or exercise that the student has to develop.
Problem solving	Activity in which problems and/or exercises related to the subject are formulated. The student must develop appropriate and correct solutions by exercising routines, applying formulas or algorithms, applying procedures for transforming the available information and interpreting the results.
Seminars	Activity focused on working on a specific topic, which allows to deepen or complement the contents of the subject.
Practices through ICT	Activities involving the application of knowledge in a given context and the acquisition of basic and procedural skills in relation to the subject, through the use of ICT.
Autonomous problem solving	Activity in which students analyse and solve problems and/or exercises related to the subject independently.
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
Problem solving	Attention in the distance learning phase: This will be carried out through the use of telematic means. Students who wish to do so will be able to ask the faculty questions in forums or by e-mail. They will also be able to arrange individual tutorials with the lecturer, which will take place via videoconference.
Practices through ICT	Attention in the face-to-face phase: Although it is still possible to use telematic mechanisms for student attention, face-to-face tutoring mechanisms (individual and/or group) will also be used during this phase.

Assessment

	Description	Qualification	Training and Learning Results
Practices through ICT	Activities involving the application of knowledge in a specific context and the acquisition of basic and procedural skills in relation to the subject, through the use of ICT. They allow the student's knowledge and skills to be assessed. They will be assessed by means of deliverables. They will be assessed by means of deliverables (PT) and will be carried out in the face-to-face phase.	15	A6 B1 C7 A7 B3 A8 B6
Self-assessment	A mechanism in which, by means of a series of questions or activities, it is possible for the student to autonomously evaluate his/her degree of acquisition of knowledge and skills on the subject, allowing self-regulation of the personal learning process. Three questionnaires (AV1, AV2 and AV3) will be carried out and assessed during the distance phase.	10	A6 B1 C7 A7 B3 A8 A9
Essay	Delivery of a report by the students, individually or in groups, about a topic related to the contents of the subject or about the results of a work, exercise, project, etc. This work (T) will be assessed during the distance phase.	30	A6 B1 C7 D4 A7 B3 A8 B6 A9

Presentation	Presentation by the students, individually or in groups, of a topic related to the contents of the subject or of the results of a work, exercise, project, etc. Knowledge, skills and attitudes can be assessed through the presentation. This presentation (P) will be assessed during the face-to-face phase.	15	A6 A7 A8 A9 A10	B1 B3	C7	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 written examination (PE) will take place at the end of the face-to-face phase.	30	A6 A7 A8 A9 A10	B1 B3	C7	

Other comments on the Evaluation

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

MED_CON = 0.1* (AV1+AV2+AV3)/3 + 0.3* T + 0.15*P + 0.15*PT + 0.3*PE

A minimum mark of 50% is required 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) on the dates established for this purpose by the Master's Academic Committee. The assessment of the extraordinary call will be carried out in distance mode. In order to pass the course it will be necessary to pass the different parts into which the subject is divided.

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 of any discrepancies between the guides in Galician/Spanish/English regarding evaluation, the indications stated in the Spanish version of the course guide will always prevail.

Sources of information
Basic Bibliography
Complementary Bibliography

S. Tanenbaum, D. Wetherall, **Computer Networks: International Version**, 5ª Edición, Prentice-Hall, 2010

J. F. Kurose, K. W. Ross, **Computer Networking: A Top-Down Approach**, 6ª Edición, Pearson, 2012

R. K. Jain, **The Art of Computer Systems Performance Analysis: Techniques for Experimental Design, Measurement, Simulation, and Modeling**, 1ª Edición, Wiley, 1991

K. R. Fall, W. R. Stevens, **TCP/IP Illustrated, Volume 1: The Protocols**, 2ª Edición, Addison-Wesley, 2011

K. R. Fall, W. R. Stevens, **TCP/IP Illustrated, Volume 2: The Implementation**, 2ª Edición, Addison-Wesley, 2011

Recommendations

Other comments
It is recommended that students taking this course have a basic knowledge of computer networks.