Teaching Guide				
Identifying Data				2023/24
Subject (*)	Networks		Code	614G03013
Study programme	Grao en Intelixencia Artificial			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatory	6
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Álvarez González, Marco Antonio	E-mail	marco.antonio.agonzalez@udc.es	
Lecturers	Álvarez González, Marco Antonio Fernández López-Vizcaíno, Manuel	E-mail	marco.antonio.agonzalez@udc.es manuel.fernandezl@udc.es	
Web	campusvirtual.udc.gal			
General description	Transmission medium. Network technologies. Access networks. Routing protocols. System virtualization. Network services, Cloud services.			

Study programme competences / results	
Code	Study programme competences / results
A4	Conocer la estructura, organización, funcionamiento e interconexión de los sistemas informáticos (computador, sistemas operativos y redes de computadores).
A5	Comprender y aplicar los principios y técnicas básicas de la programación paralela y distribuida para el desarrollo y ejecución eficiente de las técnicas de inteligencia artificial.
A6	Capacidad para realizar el análisis, diseño, implementación de aplicaciones que requieran trabajar con grandes volúmenes de datos, aplicando arquitecturas hardware/software adecuadas.
B2	Que el alumnado sepa aplicar sus conocimientos a su trabajo o vocación de una forma profesional y posea las competencias que suelen demostrarse por medio de la elaboración y defensa de argumentos y la resolución de problemas dentro de su área de estudio.
B5	Que el alumnado haya desarrollado aquellas habilidades de aprendizaje necesarias para emprender estudios posteriores con un alto grado de autonomía.
B7	Capacidad para resolver problemas con iniciativa, toma de decisiones, autonomía y creatividad.
C3	Capacidad para crear nuevos modelos y soluciones de forma autónoma y creativa, adaptándose a nuevas situaciones. Iniciativa y espíritu emprendedor.

Learning outcomes			
Learning outcomes	Study programme competences / results		
To understand the basic operation of current computer networks and the importance of the standardised protocols.	A4	B2 B5 B7	C3
To understand the operation of the protocols on which the Internet and current local networks are based.	A4	B2 B5 B7	C3
To learn how to configure and manage a local network.	A4	B2 B5 B7	C3
To understand the bases of cloud computing, and cloud models.	A4 A5 A6	B2 B5 B7	C3

To know the different mechanisms of server virtualisation and be able to deploy virtualised systems.	A4	B2 B5 B7	C3
To know and understand the different service and deployment models related to cloud computing, as well as the services provided by Artificial Intelligence oriented cloud providers.	A5 A6	B2 B5 B7	C3
To set in motion cloud services.	A5 A6	B2 B5 B7	C3
To know how to conceive and design new applications based on the Internet or the technologies that support it.	A4 A5 A6	B2 B5 B7	C3

Contents	
Topic	**Sub-topic**
Introduction	Computer networks and Internet Introduction to TCP/IP
Link layer	Link layer technologies TCP/IP and the link layer
Network layer	IP and subnetting Routing ICMP
Transport layer	UDP and TCP TCP data transfer
Application layer	Application layer protocols
Virtualization	System virtualization
Services	Network services Cloud services

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A4 A5 A6 B5 B7	30	30	60
Laboratory practice	A4 A5 A6 B2 B5 B7 C3	30	30	60
Seminar	A4 A5 A6 B2	1	10	11
Objective test	A4 A5 A6 B2 B7	3	15	18
Personalized attention		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	
Methodologies	**Description**
Guest lecture / keynote speech	The university virtual platform will be used as a basis to publish all the required material to follow the lectures. During the lectures the theoretical concepts of the subject will be presented, encouraging the student participation.
Laboratory practice	The university virtual platform will be used as a basis to publish all the required material to do the laboratory practices. In the laboratory the students must deepen certain theoretical issues of the subject. In order to achieve this objective, there will be laboratories based on network emulation/simulation and/or protocol analyzer tools, as well as virtualization and services/cloud computing.
Seminar	The university virtual platform will be used as a basis to publish all the required material to do the seminars. Through the seminars, certain contents of the subject will be deepened through the completion of work and/or tests by the student.

Objective test	At the end of the four-month period there will be an exam where the student must prove his knowledge of the subject.

Personalized attention	
Methodologies	**Description**
Laboratory practice	The personalized attention for laboratory practices and seminars is essential for an adequate subject development for the student. Moreover, the students are recommended to attend tutorials as a support method. From the teacher perspective, the personalized attention will allow to detect possible imbalances in the subject methodology and improve the quality in continuously. Tutorials: https://www.udc.es/en/centros_departamentos_servizos/centros/titorias/?codigo=614

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Laboratory practice	A4 A5 A6 B2 B5 B7 C3	The laboratory practices done by the students throughout the course will be evaluated. The laboratory practices grade can not be recovered in the second opportunity nor in the extraordinary call.	30
Objective test	A4 A5 A6 B2 B7	At the end of the four-month period there will be an exam where the student must prove his knowledge of the subject. In case of obtaining less than a 4 (out of 10) in the exam, the subject will receive a failing grade and the final qualification will be the obtained in the exam. In other case, the final grade is calculated from the grades of each part, proportionally, and must be equal to or greater than 5 (out of 10) to pass the subject.	65
Seminar	A4 A5 A6 B2	Students will be given a series of tasks/tests that will allow them to consolidate their knowledge throughout the course. The grade from the seminars can not be recovered in the second opportunity nor in the extraordinary call.	5

Assessment comments
The laboratory practices and the seminars are part of the subject continuous evaluation as therefore can not be recovered in the second opportunity nor in the extraordinary call.The part-time students will be helped in the timetable election for laboratories.Attendance to the lessons is not a requirement to pass the subject, although it is recommended.In the objective test there may be questions related to laboratory practices.Fraudulent realization of the tests or continuous evaluation activities, once verified, will directly imply a failing grade of "0" in the corresponding call for the academic year, invalidating any grade obtained in all the continuous evaluation activities for the rest of the calls of the same academic year.To pass the course, you must obtain at least a 5 out of 10 in the sum of all the parts of the subject (Laboratory practice + seminars + objective test) and obtain a minimum grade of 4 out of 10 in the objective test.

Sources of information	
Basic	- James F. Kurose, Keith W. Ross (2022). Computer Networking. A top-down approach.. Pearson - W. Richard Stevens (2012). TCP/IP Illustrated, Vol. 1: The Protocols. Addison Wesley - Matthew Portnoy (2016). Virtualization Essentials. 2nd Edition. Sybex - Edouard Bugnion, Dan Tsafrir, Jason Nieh (2022). Hardware and software support for virtualization. Springer - Thomas Erl, Zaigham Mahmood, Richardo Puttini (2013). Cloud computing : concepts, technology and architecture. Prentice-Hall - Ian Foster, Dennis B. Gannon (2017). Cloud computing for science and engineering. MIT Press - Rafael Troncoso, Elías Grande, Francisco Ramírez (2022). Docker: SecDevOps. 0xWORD
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Introduction to Computers/614G03012
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
This subject follows the values and guidelines established by the University of A Coruña, advocating for respect and equality.

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.