



Teaching Guide				
Identifying Data				2020/21
Subject (*)	Computer Infrastructure Engineering	Code	614G01059	
Study programme	Grao en Enxeñaría Informática			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Fourth	Optional	6
Language	Galician			
Teaching method	Hybrid			
Prerequisites				
Department	Enxeñaría de Computadores			
Coordinador	Pardo Martínez, Xoán Carlos	E-mail	xoan.pardo@udc.es	
Lecturers	Pardo Martínez, Xoán Carlos	E-mail	xoan.pardo@udc.es	
Web				
General description	Esta materia supón unha continuación da materia de Xestión de Infraestruturas orientada ao estudo de solucións tolerantes a fallas e de alta dispoñibilidade en centros de procesamento de datos (CPD) e unha introdución ao uso de tecnoloxías de virtualización nos CPDs e aos fundamentos da Computación na Nube (Cloud Computing).			
Contingency plan	<ol style="list-style-type: none"> <li>Modifications to the contents</li> <li>Methodologies           <ul style="list-style-type: none"> <li>*Teaching methodologies that are maintained</li> <li>*Teaching methodologies that are modified</li> </ul> </li> <li>Mechanisms for personalized attention to students</li> <li>Modifications in the evaluation           <ul style="list-style-type: none"> <li>*Evaluation observations:</li> </ul> </li> <li>Modifications to the bibliography or webgraphy</li> </ol>			

Study programme competences / results	
Code	Study programme competences / results
A36	Capacidade para comprender, aplicar e xestionar a garantía e a seguridade dos sistemas informáticos.
A37	Capacidade para analizar, avaliar, seleccionar e configurar plataformas hardware para o desenvolvemento e execución de aplicacións e servizos informáticos.
B1	Capacidade de resolución de problemas
B3	Capacidade de análise e síntese
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.

Learning outcomes			
Learning outcomes			Study programme competences / results
Know the software and hardware systems that allow the implementation of fault tolerant solutions	A36	B1	C3
	A37	B3	C6



Coñecer as alternativas tecnolóxicas para implantar solucións de alta dispoñibilidade nos centros de procesamento de datos	A36 A37	B3	C3
Saber configurar solucións de alta dispoñibilidade utilizando as ferramentas informáticas axeitadas	A36 A37	B1	C3
Coñecer os fundamentos da virtualización e as súas aplicacións máis relevantes nos centros de procesamento de datos	A37	B3	C3 C6
Coñecer os fundamentos da computación na nube (Cloud Computing)	A37	B3	C6
Saber utilizar os servizos básicos de provedores cloud públicos	A37	B1	C3

Contents	
Topic	Sub-topic
Tolerancia a fallas, redundancia e alta dispoñibilidade	
Servidores e clusters de servidores	
Module I: High Availability Data Center Architectures	1.- Introduction to High Availability (HA) 2.- Architecture of a Data Center 3.- Servers of a Data Center for HA 4.- Clusters of a Data Center for HA
Module II: Virtualization and Cloud Computing	1.- Virtualization technologies 2. Virtualization of the Data Center 3.- Computing in the Cloud (Cloud Computing)
Computación na nube (Cloud Computing)	

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Laboratory practice	B1 C3	14	42	56
Objective test	A36 A37	3	0	3
Supervised projects	A37 B3 C6	6	18	24
Guest lecture / keynote speech	A36 A37 C6	21	42	63
Personalized attention		4	0	4

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

Methodologies	
Methodologies	Description
Laboratory practice	Activity that allows students to learn and consolidate the knowledge already acquired through the realization of practical sessions in computers.
Objective test	Test that will be done at the end of the semester, on the contents of the lectures and the laboratory practices.
Supervised projects	Resolution of a study case of greater difficulty to those made in the practices, studying in greater depth a specific application directly related to the contents of the subject. A report on the work carried out must be submitted, summarizing the main conclusions of it.
Guest lecture / keynote speech	Presentation complemented with the use of audiovisual media and the introduction of debate phases with the students. All this in order to transmit knowledge and facilitate learning.

Personalized attention	
Methodologies	Description



Laboratory practice Supervised projects	<p>Personalized attention during the laboratories will be used to guide and verify the work that students are doing according to the instructions given to them, depending on the specific lab.</p> <p>All the lecturers will also propose a tutorial schedule in which the students can solve any doubt. The tutorials are recommended as a fundamental part of the learning support.</p>
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Assessment			
Methodologies	Competencies / Results	Description	Qualification
Laboratory practice	B1 C3	As prácticas de laboratorio consistirán en diferentes actividades que se proporán ao longo do cuadrimestre relacionadas cos contidos da materia.	40
Objective test	A36 A37	A proba obxectiva realizarase ao final do cuadrimestre e estará formada por preguntas relacionadas co temario desenvolvido nas sesións maxistras e nas prácticas.	40
Supervised projects	A37 B3 C6	Os traballos tutelados serán sobre algún tema a convir entre as/os alumnas/os e o profesor. Valoraranse entre outros o cumprimento das especificacións, a contribución persoal, e a calidade das explicacións e da presentación dos resultados.	20

Assessment comments
<p><b>FIRST OPPORTUNITY</b>The subject consists of two clearly differentiated modules. Each module will propose practices (laboratory practices and / or supervised work). To pass the practices it will be mandatory to submit all of them.The final mark will be calculated as the weighted average of the practice marks (laboratory practices and / or supervised work) and the objective test mark. To pass it, it will be necessary to reach at least 40% in each one of the marks and 50% in the average.<b>SECOND OPPORTUNITY</b>In the second opportunity, the same assessment criteria will be followed. There will be a second submission date for the practices, and the marks of those parts that have reached a minimum of 40% at the first opportunity will be conserved for the second opportunity.<b>STUDENTS AT PART TIME</b>The assessment will be the same as that of full-time students.<b>FRAUD</b>In the case of detecting any fraud in the evaluation tests, the sanctioning measures provided for in the university regulations will be applied.</p>

Sources of information	
<b>Basic</b>	<p>1. Kailash Jayaswal (2006). "Administering Data Centers: Servers, Storage, and Voice over IP". Wiley. ISBN: 978-0-471-77183-8</p> <p>2. Sander Van Vugt (2014). "Pro Linux high availability clustering".Apress. ISBN:978-1484200803</p> <p>3. Germán Pacio (2015). "Data Centers Hoy". Marcombo. ISBN: 978-8-42672-156-34. Luís Joyanes Aguilar (2013). "Computación en la Nube: Estrategias de Cloud Computing en las Empresas". Marcombo. ISBN: 978-8-42671-893-8</p>
<b>Complementary</b>	<p>1. Hwaiyu Geng (2015). "Data Center Handbook". Wiley. ISBN: 978-1-118-43663-92. Gustavo Santana (2014). "Data Center Virtualization Fundamentals". Cisco Press. ISBN: 978-1-58714-324-3</p> <p>1. Hwaiyu Geng (2015). "Data Center Handbook". Wiley. ISBN: 978-1-118-43663-92. Gustavo Santana (2014). "Data Center Virtualization Fundamentals". Cisco Press. ISBN: 978-1-58714-324-3</p>

Recommendations
<b>Subjects that it is recommended to have taken before</b>
<p>Infrastructure Management/614G01025</p> <p>Computer Architecture/614G01033</p>
<b>Subjects that are recommended to be taken simultaneously</b>
<b>Subjects that continue the syllabus</b>
Administration of Infrastructures and Information Systems/614G01093
<b>Other comments</b>



For the mention of Information Technology, in which this subject is optional in the 2nd term, it is recommended to attend simultaneously the subject: "Infrastructure Administration and Information Systems - AISI - (614G01113)".

(\*)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.