



Teaching Guide

Identifying Data					2016/17
Subject (*)	Network Design	Code	614G01082		
Study programme	Grao en Enxeñaría Informática				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	1st four-month period	Fourth	Obligatoria	6	
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Electrónica e Sistemas				
Coordinador	Gonzalez Lopez, Miguel	E-mail	miguel.gonzalez.lopez@udc.es		
Lecturers	Gonzalez Lopez, Miguel Vazquez Araujo, Francisco Javier	E-mail	miguel.gonzalez.lopez@udc.es francisco.vazquez@udc.es		
Web	campusvirtual.udc.es/moodle/course/view.php?id=64043				
General description	The goal of the subject is to introduce the most recent schemes in IP networks and Mobile Ad-hoc NETWORKS (MANETs). It covers topics like IPv6, virtual private networks (VPNs), Mobile IP / IPv6, MANETs, classical routing algorithms both static and dynamic, as well as their particularization to the case of MANETs.				

Study programme competences / results

Code	Study programme competences / results
A17	Coñecemento e aplicación das características, funcionalidades e estrutura dos sistemas distribuídos, as redes de computadores e internet, e deseñar e implementar aplicacións baseadas nelas.
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
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		
Coñecer en profundidade os distintos elementos cos que se pode construír unha rede de comunicacións. Capacidade de analizar as vantaxes e inconvenientes de cada topoloxía e protocolo de rede. Coñecer os algoritmos que incorporan os protocolos, e os seus contornos de aplicabilidade.	A17 A55	B1 B3	C3 C6

Contents

Topic	Sub-topic
1. Analysis, design and addressing in IP networks. Advanced IP networks (IPv6)	1.1 Introduction to IP mobility. 1.2 IPv6: motivation, differences to IPv4, IPv6 extension headers, route aggregation vs multihoming, automatic address assignment, fragmentation, Neighbour Discovery (ND) protocol.
2. Virtual Private Networks (VPNs). IPsec.	2.1 VPNs: purpose, types, Level-2 VPNs (PPP) vs Level-3 VPNs (IPsec). 2.2 IPsec: fundamentals, authentication (AH), Encapsulated Security Payload (ESP), key exchange mechanisms: the case of IKE.



3. Mobile IP / IPv6	<p>3.1 Binding Cache management.</p> <p>3.2 Return Routability procedure.</p> <p>3.3 Security management.</p> <p>3.4. Care-of Address (CoA) packet delivery.</p> <p>3.5. Home Agent discovering.</p> <p>3.6. Movement detection and link establishment.</p> <p>3.7 Fast Handover.</p> <p>3.8 Examples of application scenarios.</p>
4. MANETs: Mobile Ad Hoc Networks	<p>4.1 Motivation and fundamentals.</p> <p>4.2 Medium Access Control (MAC).</p> <p>4.3 Static and dynamic routing algorithms: general case and particularization to MANETs.</p> <p>4.4 Transport issues in MANETs.</p>

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student's personal work hours	Total hours
Guest lecture / keynote speech	A5 A17 A31 A34 A38 A55 B3 C6	30	45	75
ICT practicals	A5 A31 A34 B1 B3 C3	28	45	73
Personalized attention		2	0	2

(*)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	Sesiões expositivas de teoría en aula, así como de exemplos ilustrativos da materia.
ICT practicals	Explicación e seguimento de prácticas TIC sobre os contidos da asignatura.

Personalized attention	
Methodologies	Description
ICT practicals	Resolución de dúbidas sobre as prácticas da asignatura.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Guest lecture / keynote speech	A5 A17 A31 A34 A38 A55 B3 C6	Evaluarase mediante exame escrito.	50
ICT practicals	A5 A31 A34 B1 B3 C3	Evaluarase mediante a memoria de traballo sobre as prácticas realizada polo alumno.	50

Assessment comments
A avaliación realizarase sobre o exame final e sobre a memoria escrita sobre as prácticas. En xullo só se avaliará o exame de teoría. Avaliación no caso de alumnos a tempo parcial: igual que no caso xeral.

Sources of information	
Basic	- R. S. Koodli, C. E. Perkins (2007). Mobile Inter-networking with IPv6: Concepts, Principles and Practices. Wiley



Complementary	
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Recommendations

Subjects that it is recommended to have taken before

Network Administration/614G01048

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Communications Software/614G01034

Administration of Infrastructures and Information Systems/614G01216

Other comments

(*)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.