BASIC DETAILS:

Subject:	SISTEMAS AVANZADOS DE COMUNICACIONES		
Id.:	30081		
Programme:	GRADUADO EN INGENIERÍA INFORMÁTICA. PLAN 2008 (BOE 15/12/2008)		
Module:	COMUNICACIONES		
Subject type:	OBLIGATORIA		
Year:	4	**Teaching period:**	Primer Cuatrimestre
Credits:	6	**Total hours:**	150
Classroom activities:	70	**Individual study:**	80
Main teaching language:	Inglés	**Secondary teaching language:**	Castellano
Lecturer:		**Email:**	

PRESENTATION:

Advanced Communications Systems is divided into 2 parts: In the first one, Guided Access and Transport Technologies, foundations and performance of those communications systems that use the copper cable or the fiber as transmission medium are explained. In the second one, Radio Access Technologies, the impairments of the radio communications are exposed and afterwards the different technologies that have been used in the recent years are described.

PROFESSIONAL COMPETENCES ACQUIRED IN THE SUBJECT:

General programme competences	G02	Innovative capacity to propose and find new and efficient ways to undertake any task and/ or function within the professional environment - highly motivated by quality.
	G03	Capacity to work in multidisciplinary teams to achieve common objectives, placing group interests before personal ones.
	G04	Capacity to always commit to working responsibly - creating a strong sense of duty and fulfilment of obligations.
	G10	Critical and analytical capacity when assessing information, data and courses of action.
	G12	Capacity to undertake professional activities with integrity, respecting social, organisational and ethical norms.
	G13	Capacity to use individual learning strategies aimed at continuous improvement in professional life and to begin further studies independently.
	G14	Capacity for abstraction to handle various complex knowledge models and apply them to examining and solving problems.
	G15	Capacity to structure reality by means of linking objects, situations and concepts through logical mathematical reasoning.
Specific programme competences	E02	Capacity to apply the intrinsic engineering principles based on mathematics and a combination of scientific disciplines.
	E03	Capacity to recognise the technical principles and apply the appropriate practical methods satisfactorily to analyse and solve engineering problems.
	E08	Capacity to communicate productively with clients, users and colleagues both orally and in writing, so as to pass on ideas, solve conflicts and achieve agreements.
	E10	Capacity to understand and assess the impact of technology on individuals, organisations, society and the environment, including ethical, legal and political factors, recognising and applying the pertinent standards and regulations.s éticos, legales y políticos, reconociendo y aplicando los estándares y regulaciones oportunos
	E11	Capacity to remain up-to-date in the technological and business worlds in the area of information and communication technologies.
	E13	Capacity to identify, assess and use current and emerging technologies, considering how they apply in terms of individual or organisational needs.
	E17	Capacity to identify and analyse user needs with the intention of designing effective, usable IT solutions which can be incorporated into the user's operating environment.
	E18	Capacity to identify and define the requirements to be satisfied by IT systems to cover the stated needs of organisations or individuals.
Learning outcomes	R01	Understand the implications, problems and benefits arising from the use of a wireless communications system.

	R02	Assess different current radio communications systems and choose the most suitable for a proposed situation.
	R03	Solve wireless network dimension problems.
	R04	Understand the foundations, provisions and limitations of the main access and transport technologies using guided media.
	R05	Propose the most suitable cable access or transport system depending on the characteristics of a specific deployment scenario.
	R06	Solve design problems in a cable communications system which is able to carry distinct multimedia services.

PRE-REQUISITES:

These requirements should be fulfilled:

- Mathematics: It is important to know how to use and calculate logarithms, logarithmic units and exponential equations.

- Networks: General knowledge of the OSI stack.

SUBJECT PROGRAMME:

Subject contents:

1 - GUIDED ACCESS AND TRANSPORT TECHNOLOGIES
1.1 - Introduction and Basic Concepts
1.2 - xDSL Systems
1.3 - Optical Systems
1.4 - Hybrid Systems
2 - RADIO ACCESS TECHNOLOGIES
2.1 - Introduction
2.2 - WiFi and WiMAX
2.3 - 2nd Generation of Mobile Systems
2.4 - 3rd Generation of Mobile Systems
2.5 - 4th Generation of Mobile Systems

Subject planning could be modified due unforeseen circumstances (group performance, availability of resources, changes to academic calendar etc.) and should not, therefore, be considered to be definitive.

TEACHING AND LEARNING METHODOLOGIES AND ACTIVITIES:

Teaching and learning methodologies and activities applied:

- Master classes to explain the theoretical concepts.
- Problem solving classes to better understand the theoretical concepts.
- Realization of practices to utilize the learned concepts in an environment closer to reality.
- Individual work for the maturity of the acquired knowledge.
- Group activites to develop the ability to interact with other professionals.

Student work load:

Teaching mode	Teaching methods	Estimated hours
Classroom activities	Master classes	26
	Other theory activities	6
	Practical exercises	8
	Practical work, exercises, problem-solving etc.	8
	Debates	2
	Coursework presentations	4

	Films, videos, documentaries etc.	6
	Workshops	2
	Laboratory practice	4
	Assessment activities	4
Individual study	Tutorials	2
	Individual study	26
	Individual coursework preparation	18
	Group cousework preparation	15
	Research work	12
	Compulsory reading	4
	Recommended reading	3
	Total hours:	150

ASSESSMENT SCHEME:

Calculation of final mark:

Written tests:	60	%
Individual coursework:	20	%
Group coursework:	20	%
TOTAL	100	%

*Las observaciones específicas sobre el sistema de evaluación serán comunicadas por escrito a los alumnos al inicio de la materia.

BIBLIOGRAPHY AND DOCUMENTATION:

Basic bibliography:

J.F. Andrews, A. Ghosh, R. Muhamed. Fundamentals of WiMAX: Understanding Broadband Wireless Networking, Pretince Hall, ISBN 0-13-222552-2.
R. Steele, L. Hanzo, Mobile Radio Communications, 2ª Edición, John Wiley
T.S. Rappaport, Wireless Communications: Principles and Practice, 2ª Edición, Pretince Hall, 2001.
P. France, Local Access Network Technologies, Institution of Electrical Engineers, 2004
S. V. Kartalopoulos, Next Generation Intelligent Optical Networks - From Access to Backbone, Springer, 2008
B. Chomyzc, Planning Fiber Optic Networks, McGraw Hill, 2009
J. M. Hernando Rábanos, Comunicaciones móviles, Ed. Centro de Estudios Ramón Areces, 1997.

Recommended bibliography:

F. Pérez, S. Pagel, Introducción a las comunicaciones móviles, Servicio de Publicaciones de la Universidad de Vigo, 1997.
W.C.Y. Lee, Mobile Communications Design Fundamentals, 2ª Edición, Wiley-Interscience, 1993.
S.M. Redl, M.K. Weber, M.W. Oliphant, GSM and Personal Communications Handbook, Artech House Publisers, 1998.
J.M. Hernando Rábanos, Comunicaciones móviles. GSM, Fundación Airtel, 1999.
J.M. Hernando Rábanos, C. Lluch Mesquida, Comunicaciones móviles de tercera generación. UMTS (Volúmenes 1 y 2), Telefónica Móviles España, 2000.
P. Golden, H. Dedieu, K. S. Jacobsen, Implementation and Applications of DSL Technology, Auerbach Publications, 2008
C. Hellberg, D. Greene, T. Boyes, Broadband Network Architectures – Designing and Deploying Triple-Play Services, Prentice Hall, 2007
A. Gumaste, T. Antony, First Mile Access Networks and Enabling Technologies, Cisco Press, 2004
A. Shami, M. Maier, C. Assi, Broadband Access Networks - Technologies and Deployments, Springer, 2009
J. Crisp, Introduction to Fiber Optics (2nd Ed.), Newnes, 2001
J. Riddel, PacketCable Implementation, Cisco Press, 2007

Recommended websites:

GSM World	http://www.gsmworld.com/
IEEE 802.16	http://www.ieee802.org/16/
WiMAX Forum	http://www.wimaxforum.org/
3GPP	http://www.3gpp.org/
ITU-T	http://www.itu.int/ITU-T/
Broadband Forum	http://www.broadband-forum.org/
CableLabs	http://www.cablelabs.com/

* Guía Docente sujeta a modificaciones