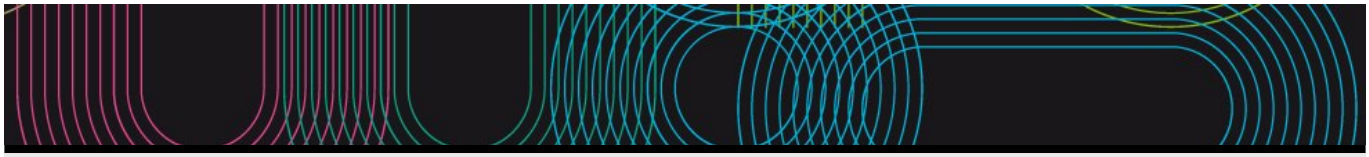

IDENTIFYING DATA				
(*)Arquitectura e tecnoloxía de redes				
Subject	(*)Arquitectura e tecnoloxía de redes			
Code	V05G300V01542			
Study programme	(*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish			
Department				
Coordinator	Rodríguez Rubio, Raúl Fernando			
Lecturers	Rodríguez Pérez, Miguel Rodríguez Rubio, Raúl Fernando			
E-mail	rrubio@det.uvigo.es			
Web	http://faitic.uvigo.es			
General description	The objective of this subject is to teach our students the technical basics that govern the modern computer networks, regarding topics like new switching paradigms, new access technologies or data transport with quality of service.			

Competencies	
Code	
A1	CG1: The ability to write, develop and sign projects in the field of Telecommunication Engineering, according to the knowledge acquired as considered in section 5 of this Law, the conception and development or operation of networks, services and applications of Telecommunication and Electronics.
A4	CG4: The ability to solve problems with initiative, to make creative decisions and to communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the Technical Telecommunication Engineer activity.
A6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
A39	CE30/TEL4 The ability to describe, program, assess and optimize communication protocols and interfaces at different network architecture layers .
A41	CE32/TEL6 The ability to design networks and service architectures.

Learning aims	
Expected results from this subject	Training and Learning Results
(*)The ability to apply modern transmission, switching and transport concepts and technologies to design, to operate and to take advantage of heterogeneous networks.	A1
(*)To identify and to know how to use specific solutions -related to switching, transport and management- to deploy networks for specific purposes.	A4
(*)To know and to apply methods and techniques to provide quality of service in networks and telecommunication services, both in open and closed environments.	A39 A41
(*)The ability to design, to manipulate and to apply advanced configurations to computer networks, from the point of view of switching, the quality of service, data transportation and the deployment of telematic services.	A6 A39 A41
(*)The ability to solve problems inventively, to work in group and to be able to communicate -both in a written and oral fashion- the knowledge, the proceedings and the results related to the management and configuration of computer networks infrastructures.	A4

Contents
Topic

Network virtualization	Tunnels Overlay networks Remote access (VPNs) Mobile IP
IPv6	Introduction Self-configuration Addressing scopes Transition mechanisms
Advanced switching mechanisms	Label switching (MPLS) MPLS applications VPNs with provider support
Access network technologies	xDSL Cable (HFC, DOCSIS) Optical access networks
Optical switching and transmission	SDH/SONET. Protection rings Circuit switching, burst switching and packet swithching

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	20	25	45
Laboratory practises	8	12	20
Tutored works	7	42	49
Presentations / exhibitions	2	4	6
Others	0	5	5
Long answer tests and development	4	15	19
Short answer tests	1	0	1
Reports / memories of practice	0	5	5

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

Methodologies

	Description
Master Session	The master lectures follow the usual scheme for this way of teaching; although, in some sessions, we will be able to dedicate 5 or 10 minutes of the class to make a simple examination (one or two brief questions) that will form part of the continuous evaluation. These short tests intend to motivate our students for a daily work.
Laboratory practises	In the labs the students will face several practical sessions -supervised by the professors- where they will settle the concepts learnt in the theoretical classes. In such practices they will use real network equipment (routers and switches) and/or virtualization software that will allow their instruction and training on their own. The practices that the teachers will pose will be designed to be done within the respective face-to-face sessions at the School; although the student that like this need will be able to reproduce them at home using free software that will allow to virtualize the network hardware used in the laboratory. Also, the professors will be able to propose optional exercises that the student will be able to do as homework; and review individually in tutorial time.
Tutored works	A project with a fairly large magnitude will be posed to be developed as a teamwork during all the semester. This practical work might require in its earliest stage to be set in context doing an additional theoretical study/research. Both works will be supervised by the professors with periodic meetings every 10/15 days (roughly). And finally, they will select some of the best works for their public exhibition before the other groups of the course.
Presentations / exhibitions	Every group must deliver the right documents where the suggested challenge (project teamwork) have to be explained in a detailed way. Also, the students must prepare a public presentation of the team solution to be defended in front of the rest of the class.
Others	A social network designed for educative purposes will be used to promote debates and other online activities that will imply the participation of our students, either collaborative or competitively.

Personalized attention

Methodologies	Description
Master Session	During tuitition time, the professors will be able to help the students either individually -in the understanding of the theoretical concepts explained in the master sessions and/or in the demonstrative lab activities, or to correct whichever optional homework done out of the class- or collectively -with the supervision of the teamwork that will share among a group of peers.
Laboratory practises	During tuitition time, the professors will be able to help the students either individually -in the understanding of the theoretical concepts explained in the master sessions and/or in the demonstrative lab activities, or to correct whichever optional homework done out of the class- or collectively -with the supervision of the teamwork that will share among a group of peers.

Tutored works	During tuitition time, the professors will be able to help the students either individually -in the understanding of the theoretical concepts explained in the master sessions and/or in the demonstrative lab activities, or to correct whichever optional homework done out of the class- or collectively -with the supervision of the teamwork that will share among a group of peers.

Assessment

	Description	Qualification
Laboratory practises	They will be marked as "passed" or "not passed". To pass them, the student must attend all the sessions of this type. If any unexpected event makes one student to miss one session, he must replace it doing an extra practice that the professor will pose dynamically.	0
Tutored works	The practical teamwork (project) that the student will face will determine one of the mid-term marks, Xb, of our continuous evaluation. The quantitative value (between 0-10) will be determined by the correctness of the solution presented by the group, the associated presentation and docs, and the individual implication of the student in the developed work.	25
Others	Using a social network will allow to define online activities (like debate forums, blogs, online mental competitions ...) that would be evaluated individually after the sistematic observation of the student involvement (Z).	10
Long answer tests and development	There will be two written exams: a mid-term exam in the middle of the semester (Xa1), and a final one (Y). Both tests are theory examinations and will be evaluated individually between 0 and 10. The second one (Y) will weight 40% of the whole mark, and the student must score at least 3/10 to pass the subject. The mid-term test, Xa1, will be involved arithmetically in a special way with the "short-response" questionaries (Xa2) and the tutored work (teamwork, Xb) to get other 50% of the whole mark.	52.5
Short answer tests	With some periodicity, and within the master sessions, the professors will be able to incorporate brief tests (short response questionaries), Xa2. These brief tests, together with the mid-term examination (Xa1), compose the complementary part of the theory but the final examination Y.	12.5

Other comments on the Evaluation

The assessment of the subject can follow either the "continuous evaluation" philosophy or a lonely "final examination". The student will choose the "continuous evaluation" path if he/she takes the mid-term written exam (Xa1) at the middle of the semester. The percentages shown in the previous section only reflect the maximun weights that could have every activity (partial mark) within the continuous evaluation strategy, and are only illustrative. The precise assessment is shown following:

In the "continuous evaluation", the whole mark will be the arithmetic weighted mean among the mark of the final examination (Y, 40%), the score associated jointly to other measurable activities done in the course (Xa1 Xa2 and Xb, 50%) and the one originated through the online activities (Z, 10%). The students must obtain at least 3/10 in both the first two marks, X and Y, as well as a □pass□ in the laboratory practices, to pass the subject. The joint partial mark associated to the rest of activities just mentioned, X, will be the geometric mean between the mark of the tutored teamwork (Xb) and the arithmetic mean between the short response tests (Xa2) and the written mid-term exam -to do in the middle of the semester- (Xa1).

X=SQRT [Xb*(0.5*Xa1+0.5*Xa2)]

FINAL MARK= 0.4*X+0.5*Y+0.1*Z

The students that do not follow the "continuous evaluation" way, must take a special final examination that will be composed of three parts: a theory examination, like the final one in the continuous evaluation (Y), an aptitude test in the laboratory, and a practical project that must be developed individually (Xb). The whole mark, in this case, will be the geometric mean between the theoretical exam and the project work, provided that the student pass the aptitude test in the lab.

Finally, the extraordinary examination session in july will have the same characteristics than the special final examination just described, but the students will be able to inherit the partial mark of any activity (Xb or Y) if that has been passed during the same academic year, independently of the assesment modality that the student had chosen.

Sources of information

Kurose & Ross, **Computer Networks**, 5ª,

Peterson & Davis, **Computer Networks**, 5ª,

Ina Minei & Julian Lucek, **MPLS-Enabled Applications**, 2ª,

Charlie Scott, Paul Wolfe & Mike Erwin, **Virtual Private Networks**, 2ª,
Christian Huitema, **IPv6**, 2ª,
Roderick W. Smith, **Broadband Internet connections: a user guide to DSL and cable**,
Walter Goralski, **Tecnologías ADSL y xDSL**,
Biswanath Mukherjee, **Optical WDM networks**,
G. Papadimitriou, C. Papazoglou & A. Pomportsis, **Optical Switching**,

Recommendations

Subjects that are recommended to be taken simultaneously

(*)Teoría de redes e conmutación/V05G300V01642

Subjects that it is recommended to have taken before

(*)Redes de ordenadores/V05G300V01403