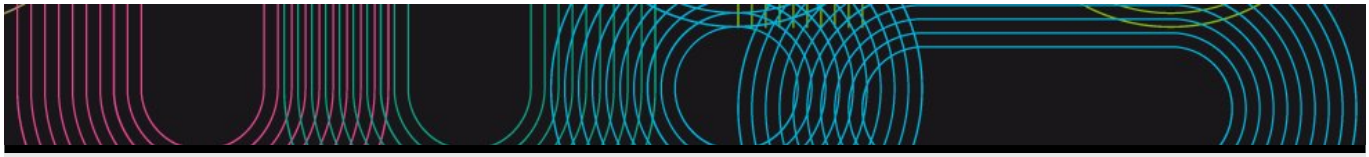

IDENTIFYING DATA				
Multimedia Networks				
Subject	Multimedia Networks			
Code	V05G300V01643			
Study programme	Degree in Telecommunications Technologies Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish			
Department				
Coordinator	Herrería Alonso, Sergio			
Lecturers	Herrería Alonso, Sergio López García, Cándido Antonio Mikic Fonte, Fernando Ariel			
E-mail	sha@det.uvigo.es			
Web	http://faitic.uvigo.es			
General description	This subject presents the main specific technological solutions for distributing multimedia contents over telecommunication networks.			

Competencies	
Code	
B3	CG3: The knowledge of basic subjects and technologies that enables the student to learn new methods and technologies, as well as to give him great versatility to confront and adapt to new situations
B6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
C30	CE30/TEL4 The ability to describe, program, assess and optimize communication protocols and interfaces at different network architecture layers .
C33	CE33/TEL7 The ability to program network and distributed applications and services.
D3	CT3 Awareness of the need for long-life training and continuous quality improvement, showing a flexible, open and ethical attitude toward different opinions and situations, particularly on non-discrimination based on sex, race or religion, as well as respect for fundamental rights, accessibility, etc.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
The comprehension of basic concepts in digital encoding of audio and video.	B3		
The knowledge of the main standards in the field of digital encoding of audio and video.	B6		
The knowledge and comprehension of the main problems raised in the transmission of multimedia contents.	B3	C30	D3
The knowledge of the main protocols used for the transmission of multimedia contents.		C30	
The knowledge and comprehension of the main techniques used to provide quality of service in Internet.	B3	C30	D3
The ability to analyze and develop VoIP networks.		C30 C33	

Contents	
Topic	
Encoding of digital audio and video	a) Digital audio (PCM). Audio compression b) Digital video. Intraframe and interframe compression

Multimedia applications	a) Classes. Quality of service (QoS) requirements b) Impact of delay and packet losses c) Content distribution. Multicast. CDN d) IP telephony: architecture, codecs, softphones, softswitches...
Multimedia protocols	a) Transport protocols: TCP/UDP, RTP, HTTP b) Adaptive streaming. MPEG-DASH c) Session protocols: SIP, H.323, RTSP
Quality of service in the Internet	a) Monitoring and policing techniques b) Scheduling and resource allocation c) Differentiated Services (DiffServ) d) Integrated Services (IntServ). RSVP

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	20	40	60
Practice in computer rooms	12	18	30
Tutored works	6	24	30
Troubleshooting and / or exercises	1	5	6
Jobs and projects	1	5	6
Troubleshooting and / or exercises	2	16	18

*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	Exhibition of the ideas, concepts and techniques of each topic of the course. In these sessions, students must acquire competences CG3, CG6, CE30 and CT3.
Practice in computer rooms	Practical learning of basic tools for the distribution of multimedia contents on computer networks. In these sessions, students must acquire competences CE30 and CE33.
Tutored works	Configuration, with the teacher's guidance, of a basic IP PBX. This work should help students to acquire competence CE33.

Personalized attention

Methodologies	Description
Master Session	It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary.
Practice in computer rooms	It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary.
Tutored works	It will be dispensed personalized attention during the office hours that will be announced at the beginning of the course. There is no appointment necessary.

Assessment

	Description	Qualification	Training and Learning Results	
Troubleshooting and / or exercises	Midterm exam covering some of the contents of the subject. Questions and problems of conceptual, logical, analytical or applied character. One hour long written exercise.	20	B3 B6	C30
Jobs and projects	Evaluation of the features and performance of the IP PBX configured by the student during the course.	20		C33
Troubleshooting and / or exercises	Final exam covering all the contents of the subject. Questions and problems of conceptual, logical, analytical or applied character. Two hour long written exercise.	60	B3 B6	C30

Other comments on the Evaluation

Two different methods of evaluation will be offered to the students: continuous evaluation and evaluation at the end of the course.

Students opting for the continuous evaluation method must take two intermediate tasks: a midterm exam around week 8 of the course (20% of the final grade) and a project involving the configuration of a basic IP PBX around week 14 of the course (20% of the final grade), together with a final exam at the end of the course (60% of the final grade). If the score of the final exam is less than 3.5, then the final grade of the subject will be the score obtained in this final exam. The score of the

project will take into account both the features and performance of the IP PBX configured (70%) and the responses to a practical exam that must be solved individually (30%). Both intermediate tasks are not recoverable and will be only valid for the current course.

Students can also opt for being evaluated by means of just a final exam at the end of the course. The final grade of the subject will be, in this case, just the score obtained in this exam.

It will be considered that a student opts for the continuous evaluation method if he takes the midterm exam or the project proposed. The final exam will contain some additional questions for those students that have opted by the evaluation at the end of the course.

If plagiarism is detected in any of the tasks proposed (exams or project), the involved students will be failed with a final grade of 0.

Those students that have not passed the subject in first call will have to take an extra written exam in July. Those students that opted for the continuous evaluation method will be able to choose between evaluation by means of just the final exam or to keep continuous evaluation. In the latter case they would keep the scores obtained in the intermediate tasks (midterm exam and project) and would only have to take the final exam as the last task. Students must indicate which method they choose at the final exam.

Sources of information

J. F. Kurose, K. W. Ross, **Computer networking: a top-down approach**, 7ª ed.,
Kun I. Park, **QoS in packet networks**, 1ª ed.,
Mario Marchese, **QoS over heterogeneous networks**, 1ª ed.,
M. Barreiros, P. Lundqvist, **QoS-enabled networks: tools and foundations**, 1ª ed.,
H. W. Barz, G. A. Bassett, **Multimedia networks: protocols, design, and applications**, 1ª ed.,
Ted Wallingford, **Switching to VoIP**, 1ª ed.,
R. Bryant, L. Madsen, J. Van Meggelen, **Asterisk: the definitive guide**, 4ª ed.,
S. Wintermeyer, S. Bosch, **Practical Asterisk 1.4 and 1.6**, 1ª ed.,
Alan B. Johnston, **SIP: Understanding the Session Initiation Protocol**, 3ª ed.,

Recommendations

Subjects that continue the syllabus

Multimedia services/V05G300V01941

Subjects that it is recommended to have taken before

Fundamentals of Sound and Image/V05G300V01405
Computer Networks/V05G300V01403