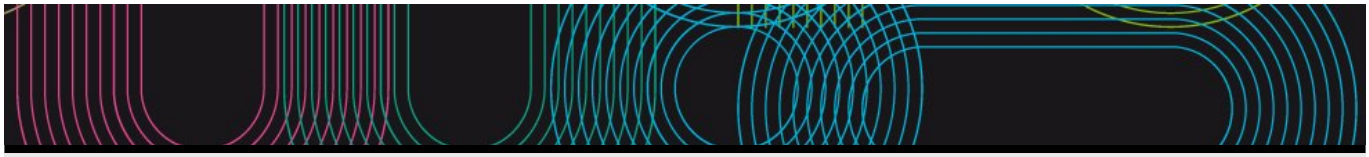

IDENTIFYING DATA				
Multimedia Networks				
Subject	Multimedia Networks			
Code	V05G306V01308			
Study programme	Grado en Ingeniería de Tecnologías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Herrería Alonso, Sergio			
Lecturers	Herrería Alonso, Sergio			
E-mail	sha@det.uvigo.es			
Web	http://moovi.uvigo.gal			
General description	This subject presents the main specific technologies for distributing multimedia contents over telecommunication networks. English Friendly subject: International students may request from the teachers: a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Training and Learning Results	
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.

Expected results from this subject	Training and Learning Results		
The understanding of the basics of digital audio and video coding, and the knowledge of the standards in the field.	B3 B6		
The knowledge and understanding of the main problems raised in the transmission of multimedia content.	B3	C30	D3
The knowledge and understanding of the main mechanisms used to provide quality of service in the Internet.	B3	C30	D3
In-depth study and analysis of IP telephony networks, mainly in the field of signaling, coexistence with the traditional telephone service and integration with the latest generation of cellular networks.		C30 C33	

Contents	
Topic	
Digital Audio and Video Encoding	a) Digital audio (PCM). Audio compression b) Digital video. Intraframe and interframes compression
Multimedia Applications	a) Classes. Quality of service requirements b) Impact of delay and packet losses c) Content distribution. Multicast. CDN d) IP telephony: architecture, codecs, softphones

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
Asterisk IP PBX	a) Installation and basic configuration b) Configuration of the dialplan c) Functionalities: voicemail, interactive menus, music on hold

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	20	40	60
Practices through ICT	10	20	30
Mentored work	6	24	30
Problem and/or exercise solving	1.5	6	7.5
Project	3	12	15
Problem and/or exercise solving	1.5	6	7.5

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

Methodologies

	Description
Lecturing	Exhibition of the ideas, concepts and techniques of each topic of the course. In these sessions, students must acquire competences CG3, CG6 and CE30.
Practices through ICT	Practical learning of basic tools for the distribution of multimedia contents on computer networks. Group activity. In these sessions, students must acquire competences CE30, CE33 and CT3.
Mentored work	Configuration, with the teacher's guidance, of a basic IP PBX. Group activity. This work should help students to acquire competences CE33 and CT3. Software to be used: Asterisk.

Personalized assistance

Methodologies	Description
Lecturing	Personalized assistance will be provided in person and/or remotely by email, Moovi forums or Campus Remoto. Sergio Herrería Alonso: https://moovi.uvigo.gal/user/profile.php?id=11341 Cándido López García: https://moovi.uvigo.gal/user/profile.php?id=11339
Practices through ICT	Personalized assistance will be provided in person and/or remotely by email, Moovi forums or Campus Remoto. Sergio Herrería Alonso: https://moovi.uvigo.gal/user/profile.php?id=11341
Mentored work	Personalized assistance will be provided in person and/or remotely by email, Moovi forums or Campus Remoto. Sergio Herrería Alonso: https://moovi.uvigo.gal/user/profile.php?id=11341

Assessment

	Description	Qualification	Training and Learning Results		
Problem and/or exercise solving	A midterm exam covering some of the content of the subject. Questions and problems of conceptual, logical, analytical or applied nature. A written exam of one and a half hours duration.	35	B3 B6	C30	
Project	Evaluation of the features and performance of the IP PBX configured during the course.	30		C33	D3
Problem and/or exercise solving	A midterm exam covering some of the content of the subject. Questions and problems of conceptual, logical, analytical or applied nature. A written exam of one and a half hours duration.	35	B3 B6	C30	

Other comments on the Evaluation

Students are offered two different methods of assessment: continuous assessment and global assessment.

Students opting for continuous assessment will be required to complete three assignments: two midterm exams (each worth 35% of the final score) and a project involving the configuration of a basic IP PBX (30% of the final score). In any case, a minimum score of 3 (out of 10) in each of the assignments is required to pass. Students who score more than five points in the overall score but less than the minimum score in any of the tasks will receive a FAIL (4.9). The score of the project will depend on the functionality and performance of the developed IP PBX (60%) and the answers to a practical exam solved individually by each member of the group (40%). None of the three assignments are recoverable and all are valid only for

the current course.

Students can also opt for a global assessment, in which case they will be evaluated by means of just one final exam covering all the contents of the subject at the end of the course. In this case, the final score of the subject will be the score obtained on that exam.

Students will be considered to have opted for continuous assessment if they take the first midterm exam or the IP PBX project. Only students who take the second midterm exam (or the final exam in case of global assessment) will be considered presented to the subject.

Plagiarism is regarded as serious dishonest behavior. If any form of plagiarism is detected in any of the three tasks, the final grade will be FAIL (0), and the incident will be reported to the corresponding academic authorities for prosecution.

Those who have not passed the subject after the ordinary opportunity will have to take, for the extraordinary opportunity, a written exam that will cover all the contents of the course. For this opportunity, the score obtained in the project can be kept, with the same weighting as in the ordinary opportunity.

For the end-of-program exams the assessment will just consist in the realization of a written exam covering all the contents of the course.

The schedule of the midterm/intermediate exams will be approved in the Comisión Académica de Grado (CAG) and will be available at the beginning of each academic semester.

Sources of information

Basic Bibliography

I. Vidal, I. Soto, A. Banchs, J. García-Reinoso, **Multimedia Networking: Technologies, Protocols and Architectures**, 1ª ed., Artech House Publishers, 2019

Z. Li, M. Drew, J. Liu, **Fundamentals of Multimedia**, 2ª ed., Springer, 2014

Kun I. Park, **QoS in packet networks**, 1ª ed., Springer, 2005

R. Bryant, L. Madsen, J. Van Meggelen, **Asterisk: the definitive guide**, 5ª ed., O'Reilly Media, 2019

Complementary Bibliography

J. F. Kurose, K. W. Ross, **Computer networking: a top-down approach**, 8ª ed., Pearson, 2021

H. W. Barz, G. A. Bassett, **Multimedia networks: protocols, design, and applications**, 1ª ed., Wiley, 2016

M. Barreiros, P. Lundqvist, **QoS-enabled networks: tools and foundations**, 2ª ed., Wiley, 2016

Bruce Hartpence, **Packet Guide to Voice over IP**, 1ª ed., O'Reilly Media, 2013

Alan B. Johnston, **SIP: Understanding the Session Initiation Protocol**, 4ª ed., Artech House Publishers, 2015

Recommendations

Subjects that continue the syllabus

Multimedia services/V05G301V01401

Subjects that it is recommended to have taken before

Fundamentals of Sound and Image/V05G301V01209
Computer Networks/V05G301V01210