Universida_{de}Vigo

IDENTIFYING DATA
(*)Comunicacións Multimedia

Subject	(*)Comunicacións Multimedia			
Code	V05M145V01206			
Study programme	(*)Máster Universitario en Enxeñaría de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Optional	1st	2nd
Teaching language	English			
Department				
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General description	In the subject "Multimedia Communications" lattices are presented as both source coding and channel coding tools. After commenting some generalities about another source coding strategy, namely Trellis Code Quantization, more advanced coding problems, as distributed source coding and joint source-channel coding, are considered. Finally, the characteristics of different multimedia signal distributions schemes, as well as services enabled by new video coding standards, are introduced.			

Competencies

Code	
B1	CG1 The ability to project, calculate and design products, processes and facilities in telecommunication engineering areas.
B4	CG4 The capacity for mathematical modeling, calculation and simulation in technological centers and engineering companies, particularly in research, development and innovation tasks in all areas related to Telecommunication Engineering and associated multidisciplinary fields.
C1	CE1 The ability to apply methods of information theory, adaptive modulation and channel coding, as well as advanced techniques of digital signal processing systems and audiovisual communications.
C4	CE4 The ability to design and plan networks for transporting, broadcasting and distribution of multimedia signals.
C6	CE6 The ability to model, design, implement, manage, operate, and maintain networks, services and contents.
C8	CE8 The ability to understand and know how to apply the operation and organization of the Internet, new generation Internet technologies and protocols, component models, middleware and services.

Learning outcomes

Expected results from this subject	Training and Learning Results
Understanding the fundamental characterisitcs of a lattice, and the properties we must take into account when facing a source coding problem and a channel coding problem.	B4 C1
Understand that a trellis code defines a lattice and why this construction is useful for source coding (Trellis-Code Quantization)	B4 C1
Understanding of the different distributed source coding schemes.	B1 B4 C1 C4 C8
Implementation of a distributed source coding scheme.	B1 B4 C1 C6 C8

Understading of the different schemes of joint source and channel coding.		B4
		C1
		C4
		C6
		C8
Implementation of a joint and source channel coding scheme.		B1
		B4
		C1
		C4
		C6
Understanding of the characteristics of different ways of multimedia signal distribution, paying special attention to streaming schemes.		B1
		C4
		C6
		C8
Asessment of the modularity of new video coding standards (e.g., MPEG-7)		B1
		C4
		C6
		C8

Contents

Topic	
1) Lattices	1) Definition
	2) Basic properties
2) Advanced source coding	1) Trellis Code Quantization
3) Distributed source coding	1) Lossless coding
	2) Lossy coding
4) Joint source-channel coding	1) Shannon's separability principle
	2) JSCC practical examples
5) Multimedia content distribution	1) DVB
	2) DVD
	3) IPTV
6) Additional services	1) Services supported by modern video coding standards

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practises	13	44	57
Master Session	15	30	45
Reports / memories of practice	0	21	21
Long answer tests and development	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

	Description
Laboratory practises	15 hours of PC lab. Programming of computational simulations. The student will simulate, by using a numerical calculus programming language (as Matlab) the multimedia communications systems introduced in this subject. Competencies: CG1, CG4, CE1, CE4, CE6, CE8.
Master Session	15 hours of theoretical lessons, where practical cases will be introduced. Furthermore, autonomous homework exercises will be proposed. Competencies: CG1, CG4, CE1, CE4, CE6, CE8.

Personalized attention

Tests	Description
Reports / memories of practice	The personalized attention will be mainly focused on both the practical part of the subject, and the consulting hours; they will be mainly related to the realization of practical homeworks.

Assessment

	Description	Qualification	Training and Learning Results

Laboratory practises	Numerical simulation programming.	30	B1 B4	C1 C4 C6 C8
Reports / memories of practice	Report on lab practises.	10	B1	C1 C4 C6
Long answer tests and development	Final exam.	60	B1 B4	C1 C4 C6

Other comments on the Evaluation

In order to do the weighted average of the different qualifications (corresponding to continual assessment), the student should submit all the mentioned tasks. Furthermore, a minimum mark of 40% should be achieved in the final exam.

Those student who choose to be evaluated by final assessment will have to do the final exam (based on long answer and development questions), as well as a practical exam.

The same rules are applied to the second call.

Plagiarism/copy in any of the tasks described above implies automatic failure.

Sources of information
Cover and Thomas, **Elements of information theory**, Wiley,
Artículos científicos especificados por el profesorado,

Recommendations

Subjects that it is recommended to have taken before
(*)Tratamento de Sinal en Comunicacións/V05M145V01102

Other comments
Even if this subject has not a series of mandatory prerrequisites, it is highly recommended that the student has a minimal background on:

- Statistics.
- Signal Processing.
- Channel coding.
- Source coding.
- Internet networks and protocols.