



## IDENTIFYING DATA

### Multimedia Services

Subject	Multimedia Services			
Code	V05G300V01941			
Study programme	(*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Spanish			
Department				
Coordinator	Blanco Fernández, Yolanda			
Lecturers	Blanco Fernández, Yolanda López Nores, Martín			
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General description	<p>The aim of this subject is to provide the students with the theoretical foundations and the practical skills that allow them to understand the basic principles of the digital treatment of the multimedia information. To this aim, it is necessary to present the main standards in the field of the multimedia processing, as well as the available mechanisms for the transmission of the audiovisual information through telematic networks. The focus is put on the realm of television, dealing with both the digital terrestrial TV broadcasting (DTTV) and the transmission over IP networks (IPTV).</p> <p>The practical part of the subject will allow the students to experiment with the design and development of telematic services based on the transmission of multimedia streams, along with the programming of interactive services about digital television broadcasting and video-on-demand.</p>			

The documentation of the subject will be available in English.

## Competencies

Code	
A3	CG3: The knowledge of basic subjects and technologies that capacitates the student to learn new methods and technologies, as well as to give him great versatility to confront and update to new situations
A6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
A9	CG9: The ability to work in multidisciplinary groups in a Multilanguage environment and to communicate, in writing and orally, knowledge, procedures, results and ideas related with Telecommunications and Electronics.
A93	(CE84/OP27) The ability to apply the techniques based on computer, networks and distributed applications and services, in the broadcasting and interchange of audiovisual information.

## Learning aims

Expected results from this subject	Training and Learning Results
Understand the basic foundations of the digital treatment of the multimedia information.	A3
Know the main standards in the field of the processing of the multimedia information.	A6 A93
Understand the foundations and the main mediums adopted in digital TV broadcasting.	A3 A6
Know the basic foundations of the transmission of audiovisual information through telematic networks.	A3 A6
Acquire skills in the design and development of telematic services based on exchanging audiovisual contents.	A3 A9 A93
Acquire skills for the programming of telematic services in the scope of interactive digital television.	A6 A93

<b>Contents</b>	
Topic	
1. Multimedia systems: Foundations and basic concepts	a. Digitalization of audio and video signals. b. Format for storage of audio and video signals. c. Conditional access and digital rights management.
2. Terrestrial Digital TV broadcasting	a. Architecture b. Transport of bitstreams c. Signaling d. Middlewares e. Mobile Digital Television
3. IP Television and video-on-demand	a. Architecture b. Data distribution. VoD and nVoD. c. Broadcasting, multicasting and P2P d. Systems and protocols e. Signaling

<b>Planning</b>			
	Class hours	Hours outside the classroom	Total hours
Presentations / exhibitions	2	2	4
Projects	7	33	40
Practice in computer rooms	4	7	11
Practice in computer rooms	8	22	30
Master Session	19	35	54
Multiple choice tests	2	9	11

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

<b>Methodologies</b>	
	Description
Presentations / exhibitions	The students, organized into groups of 2-3 people (as per professor's criteria), will expose to their mates in the computer room the design proposed for the project planned for the group classes. The aim is to argue the advantages and problems of each model, promoting the debate around the proposal of each group. The professor will carry out a personalized follow-up of each group, with the goal of fixing possible deficiencies and guiding right design decisions.
Projects	These methodologies will assess the skills CG3, CG6 and CG9. The students, organized in groups of 2-3 people (as per professor's criteria), will implement the project posed by the professor. The goal is to boost a collective discussion to identify the key points in the development of the project. The students will combine face-to-face work in the computer room with the individual work.
Practice in computer rooms	These methodologies will assess the skills CG3 and CG6. The professor will propose practices in which the students will deal with the main concepts explained in the subject, putting the focus on the coding formats adopted in the transmission of multimedia information. The doubts arisen during the autonomous work of the students in the computer room will allow to promote the debate of the group to agree the best solution for each problem.
Practice in computer rooms	These methodologies will assess the skills CE84 and CG6. The professor will propose practices in which the students will deal with the main concepts explained in the subject, putting the focus on possible applications in the realm of Terrestrial Digital TV and transmission of television over IP. The doubts arisen during the autonomous work of the students in the computer room will allow to promote the debate of the group to agree the best solution for each problem.
Master Session	These methodologies will assess the skills CE84, CG3 and CG6. Classes where the main theoretical concepts of the subject will be explained, by proposing examples and possible application scenarios in the context of the transmission of multimedia streams.
	These methodologies will assess the skills CG3 and CG6.

<b>Personalized attention</b>	
Methodologies	Description

Presentations / exhibitions	The personalized attention will be based on following-up the work of each student, by tracking the solutions proposed for the practices in room computers and group projects, and the public presentation of their designs and implementations.
Projects	The personalized attention will be based on following-up the work of each student, by tracking the solutions proposed for the practices in room computers and group projects, and the public presentation of their designs and implementations.
Practice in computer rooms	The personalized attention will be based on following-up the work of each student, by tracking the solutions proposed for the practices in room computers and group projects, and the public presentation of their designs and implementations.
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### Assessment

	Description	Qualification
Presentations / exhibitions	The students, organized into groups of 2-3 people (as per professor's criteria), will present the design proposed for the project planned for group classes. These oral presentations will take place in the lab during the penultimate week of the course.  In these practices the skills CG6 and CG9 will be assessed.	10
Projects	The students, organised in groups of 2-3 people (according to the criterion of the professor), will have to develop a project linked to the command of the digital TV by diffusion or to the TV on IP. This project must be delivered in a date to be confirmed between 8th and 17th January, 2015. The project must include the code and the necessary documentation to justify the decisions of design and the criteria considered in the development of the solution proposed.  This proof will evaluate the competitions CG3 and CG6.	30
Practice in computer rooms	The students, organized in groups of 2 people, will submit a report about the solution proposed for the first practice in the computer room, which will be about coding formats adopted in the transmission of multimedia streams. If necessary, the submission will include also the software used in the development of the solution proposed. This first practice will be submitted during the 4th week of the course.  In these practices the skills CG6 and CE84 will be assessed.	10
Practice in computer rooms	Each student will submit individually a report about the solution proposed for the second practice in the computer room. This practice will be about Digital TV broadcasting. The submissions will include the software used in the development of the solution, along with documentation to justify design decision and implementation details. This second practice will be submitted during the 8th week of the course.  In these practices the skills CE84, G6 and CG3 will be assessed.	20
Multiple choice tests	Each student will take an exam including multiple choice tests, where the goal is to validate their practical skills and understanding level about the theoretical concepts acquired during the course. This exam will take place in the official date published at <a href="http://www.teleco.uvigo.es">http://www.teleco.uvigo.es</a> . Note that support materials are not allowed.  In these practices the skills CG6 and CG3 will be assessed.	30

### Other comments on the Evaluation

There exist two mechanisms for the assessment of students in this subject: continuous assessment (CA) and traditional assessment (TA). Regardless of the considered assessment mechanism, the pass mark for the subject is 5 out of 10.

The students must choose one of the possible mechanisms by bearing in mind the following conditions:

- CA includes the 5 tests described above.
- Students who sit CA must submit during the 4th week of the course their solution for the first practice proposed in the computer room (3rd test in the previous section). By the submission of this practice the student makes a commitment to be assessed via CA, thus renouncing the TA mechanism. In virtue of this commitment, these students will not be listed as "Not Present".
- Students who do not submit the first practice during the 4th week of the course renounce to the CA, thus being assessed through the TA mechanism. Note that it will not be possible to join the CA in the next tests.
- CA tests will be carried out only in the dates defined by the professors. These CA tests cannot be repeated later.
- The grades obtained in the CA and other exams and practical projects are only valid for the current academic year.

- CA will be just considered in the first opportunity to pass the subject. In the second one only TA will be valid.

**Students who sit CA in the first opportunity to pass the subject** will be assessed as follows:

- CA tests will be 100% of the final remark of the student. This assessment mechanism consists of five CA tests that have been previously described (a multiple-choice test, two practices in the computer room, public presentation of the design of a practical project and the final implementation of this project). Note that the student makes a commitment to follow-up CA by submitting the first practice during the 4th week of the course, thus renouncing the TA mechanism.

**Students who sit TA in the first opportunity to pass the subject** will be assessed as follows:

- A final exam that these students will take in the official date published at <http://www.teleco.uvigo.es>. This test will include short-answer questions and/or multiple-choice tests, along with problems and practical use cases to be analyzed and resolved. The weight of this exam in the final remark is 50%. Note that support materials are not allowed.
- Submission of a practical project that will include software and documentation to justify design decisions and describe implementation details. The weight of this project in the final remark is 50%. Note that each student must submit this project individually in a date to be confirmed between 8th and 17th January, 2015.

Students who did not pass the subject in the first opportunity, will have **a second opportunity** where they cannot be assessed via CA, so that **only TA is valid**. Therefore, these students must (i) take the final exam (in the official date published at <http://www.teleco.uvigo.es>) and (ii) submit individually the practical project (in the date published by professors at [www.faitic.uvigo.es](http://www.faitic.uvigo.es)), as described above for the TA mechanism. The weight of each part in the final remark will be 50%.

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#### Sources of information

Wes Simpson, **Video over IP IPTV, Internet video, H.264, P2P, Web TV, and streaming: a complete guide to understanding the technology**, Elsevier,

Artur Lugmayr, Samuli Niiranen, Seppo Kalli, **Digital Interactive TV and metadata**, Springer,

George Lekakos, Konstantinos Chorianopoulos, Georgios Doukidis, **Interactive Digital Television: technologies and applications**, IGI Publishing,

José J. Pazos Arias, Carlos Delgado Kloos, Martín López Nores, **Personalization of Interactive Multimedia Services: a research and development perspective**, Nova Science Publishers,

Liliana Ardissono, Alfred Kobsa, Mark Maybury, **Personalized Digital Television: targeting programs to individual viewers**, Kluwer Academic Publishers,

Other sources of information related with DVB standards (<http://www.dvb.org/technology/standards/>):

- Framing structure, channel coding and modulation for digital terrestrial television (IN 300 744 V1.6.1). January 2009.
- Implementation guidelines for DVB terrestrial services; Transmission aspects (TR 101 190 V1.3.2). May 2011.
- Mega-frame for Single Frequency Network (SFN) synchronization (TS 101 191 V1.4.1). June 2004.

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#### Recommendations

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#### Other comments

It is recommendable that the Telematics module had been passed.

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