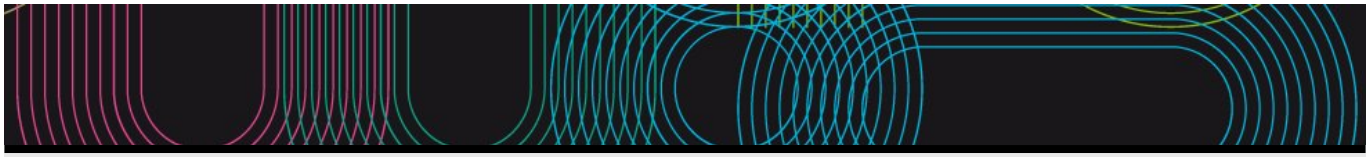

IDENTIFYING DATA				
(*)Xestión do espectro radioeléctrico				
Subject	(*)Xestión do espectro radioeléctrico			
Code	V05G300V01616			
Study programme	(*)Grao en Enxeñaría de Tecnoloxías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish			
Department				
Coordinator	García Sánchez, Manuel			
Lecturers	García Sánchez, Manuel Torío Gómez, Pablo			
E-mail	manuel.garciasanchez@uvigo.es			
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General description	The management of the radioelectric spectrum, a natural resource, limited and scarce, pursues the most efficient use of the spectrum by means of the application of effective processes, to facilitate the implementation of communication systems and to guarantee minimum interference. To acomplish this objectives, engineering tools, planning, management and technical survey and certification are needed. Besides in this matter study of the SMATV systems and Structured Wiring are included.			

Competencies	
Code	
B5	CG5: The knowledge to perform measurements, calculations, assessments, appraisals, technical evaluations, studies, reports, task scheduling and similar work to each specific telecommunication area.
B6	CG6: The aptitude to manage mandatory specifications, procedures and laws.
B7	CG7: The ability to analyze and assess the social and environmental impact of technical solutions.
B8	CG8: To know and apply basic elements of economics and human resources management, project organization and planning, as well as the legislation, regulation and standarization in Telecommunications.
B9	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.
C21	CE21/ST1 The ability to construct, exploit and manage telecommunication networks, services, process and applications, considered as systems of receiving, transporting, representation, processing, storage, management and presentation of multimedia information from the point of view of transmission systems.
C25	CE25/ST5 The ability to select transmission antennas, equipment and systems, propagation of guided and non-guided waves, with electromagnetic, radiofrequency and optical media, and their corresponding radio electric spectrum management and frequency designation.
D4	CT4 Encourage cooperative work, and skills like communication, organization, planning and acceptance of responsibility in a multilingual and multidisciplinary work environment, which promotes education for equality, peace and respect for fundamental rights.

Learning outcomes		
Expected results from this subject	Training and Learning Results	
Understand the concepts of frequency allocation, allotment and assignment.	B6	C21
Apply concepts of base station certification.	B6 B7 B8	C21
Propose solutions for fulfilment the broadcast limits.	B5 B6 B7 B8	C25

Interference analysis	B5 B6 B8 B9	C21 C25	D4
Telecommunications Cabling Standards	B5 B6 B8	C21 C25	
Field measurements	B5 B9	C21 C25	D4

Contents

Topic	
Introduction	Introduction to the matter. General concepts.
Spectrum management	National and international regulatory bodies International management and coordination National management The Telecommunications Law National telecommunication Plans CNAF
Spectrum engineering	Specifications of telecommunication equipmnet. Radio wave propagation. Coverage. Interferences. Re-use distance. Techniques to share the spectrum.
Modulations	Definitions The radio channel Objective of the modulation Types Analog Modulations: AM, FM Digital Modulations Wideband Modulations
Frequency planning	Trellis method List method Other methods Examples
Technical surveillance	The specrrum analyzer The wideband sounder measurement procedures for radioelectric base station certification
SMATV	Introduction Rules Design Examples
Structured wiring.	Introduction Rules Design Examples

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practises	1	2	3
Tutored works	3	45	48
Practice in computer rooms	6	6	12
Outdoor study / field practices	11	11	22
Others	2	25	27
Master Session	19	19	38

*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	Activities of application of the acquired knowledge to particular situations. Acquisition of basic skills related with the matter. Specific measurement equipment as Spectrum Analysers , Field level sounders, etc, will be used. Through this methodology the competencies CG5, CG6, CG8, CG9, CE21, CE25 and CT4 are developed.
Tutored works	The student, alone or in a small group with other students, elaborates a report on a given subject. This includes the search of the information, reading, writting, etc Through this methodology the competencies CG9 and CT4 are developed.
Practice in computer rooms	Activities of application of the acquired knowledge to particular situations. Acquisition of basic skills related with the matter using computer programs. Through this methodology the competencies CG5, CG6, CG8, CG9, CE21, CE25 and CT4 are developed.
Outdoor study / field practices	Field activities. Activities of application of the acquired knowledge to particular situations. Acquisition of basic skills related with the matter. Specific measurement equipment as Spectrum Analysers , Field level sounders, etc, will be used. Through this methodology the competencies CG5, CG6, CG8, CG9, CE25 and CT4 are developed.
Others	Written exam on the contents of the matter. Through this methodology the competencies CG5, CG6, CG7, CG8, CE21 and CE25 are developed.
Master Session	Master lecture given by the teacher. Through this methodology the competencies CG5, CG6, CG7, CG8, CE21 and CE25 are developed.

Personalized attention

Methodologies	Description
Master Session	The students will have the opportunity to ask their doubts and questions during the learning activities, attending to scheduled meetings with the lecturer, or by means of email
Laboratory practises	The students will have the opportunity to ask their doubts and questions during the learning activities, attending to scheduled meetings with the lecturer, or by means of email
Tutored works	The students will have the opportunity to ask their doubts and questions during the learning activities, attending to scheduled meetings with the lecturer, or by means of email
Practice in computer rooms	The students will have the opportunity to ask their doubts and questions during the learning activities, attending to scheduled meetings with the lecturer, or by means of email
Outdoor study / field practices	The students will have the opportunity to ask their doubts and questions during the learning activities, attending to scheduled meetings with the lecturer, or by means of email

Assessment

	Description	Qualification	Training and Learning Results		
Laboratory practises	Performing measurements on a panel for TV signal distribution.	2.5		C21 C25	
Tutored works	Preparing reports and presentations about issues related to spectrum management, that will be presented in class.	15	B9		D4
Practice in computer rooms	The coverage area of an AM station will be calculated. It will be evaluated with the memory of the practice.	5	B6 B9	C21 C25	D4
Outdoor study / field practices	Basic use of the spectrum analyser. Measurement of the bandwidth of a FM signal. Measurement of TDT signals. Installation of a parabolic antenna. Phase 1 and phase 2 measurements. Execution of the practice or test when finalising the practice.	27.5	B5 B7 B9	C21 C25	D4
Others	Written exams of the contents of the matter.	50	B6 B7 B8	C21 C25	

Other comments on the Evaluation

1)Following the guidelines of the degree we offer to the students two schemes of evaluation in the ordinary announcement, at the end of the semester: continuous assessment and final assessment. The students will have to opt by one of the two schemes before the delivery of the report of the first practice.

a)Continuous assessment. The continuous assessment will be based on the report of the PC practice and the tests of the other seven practices. The work will be assessed by means of the presentation in class. A partial written exam will take place in the middle of the semester. The last task of the continuous evaluation is a written exam. These tasks are not recoverable and only are valid for the current course.

b)Final evaluation. The students that do not opt to her continuous assessment will have to complete two written exams, one

related to the theoretical contents (50%) and the other to the practical contents (50%) in the official date of examination.

2) Extraordinary announcement (July). The students that have previously opted by continuous assesment will be able to opt between repeating the written examinations (50% of the mark) or examine again of all the matter (100% of the mark) by means two written exams, one related to the theoretical contents (50%) and the other to the practical contents (50%). They will communicate the option they choose before the official date of the examination. The rest of the students will examine of all the matter (100% of the mark) by means two written exams, one related to the theoretical contents (50%) and the other to the practical contents (50%).

Sources of information
International Telecomunication Union, **ITU-R recommendations**,
International Telecomunication Union, **Radiocomunication Rules**, 2012,
International Telecomunication Union, **National Spectrum management Manual**, 2005,
Gretel-COIT, **La evolución de la gestión del espectro radioeléctrico**, 2007,
SETSI, **Cuadro Nacional de Atribución de Frecuencias**, 2013,

Recommendations

Subjects that it is recommended to have taken before
Signal Transmission and Reception Techniques/V05G300V01404
Electromagnetic Transmission/V05G300V01303
Radio Communication Systems/V05G300V01512