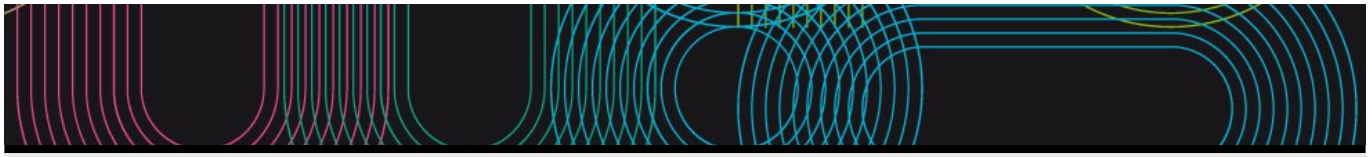

IDENTIFYING DATA				
(*)Radio				
Subject	(*)Radio			
Code	V05M145V01103			
Study programme	(*)Máster Universitario en Enxeñaría de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	5	Mandatory	1st	1st
Teaching language	Spanish			
Department				
Coordinator	Arias Acuña, Alberto Marcos			
Lecturers	Arias Acuña, Alberto Marcos Rubiños López, José Óscar Vazquez Alejos, Ana			
E-mail	marcos@com.uvigo.es			
Web				
General description				

Competencies	
Code	
A2	CB2 Students must apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study.
A4	CB4 Students must communicate their conclusions, and the knowledge and reasons stating them-, to specialists and non-specialists in a clear and unambiguous way.
A20	CE2 The ability to develop radio communication systems: antenna, equipment and subsystems design; channel modeling; link budgeting; and planning.
A23	CE5 The ability to design systems of radio navigation and positioning, as well as radar systems.

Learning aims		
Expected results from this subject	Typology	Training and Learning Results
(*)Capacidad para realizar diseños básicos de antenas	Know How	A2 A20
(*)Capacidad para diseñar sistemas de radionavegación y posicionamiento	Know How	A4 A23
(*)Capacidad para diseñar sistemas radar	Know How	A4 A23
(*)Capacidad para calcular el balance de enlace teniendo en cuenta tanto señal como perturbaciones en distintos escenarios	Know How	A2 A20

Contents	
Topic	
1. Basic design of antennas	1.1 Fundamental electromagnetic laws 1.2 Trasmitting antenna 1.3 Receiving antenna 1.4 Bands of frequency 1.5 Types of antennas 1.6 Friis Formula 1.7 Transmission losses

2. Models of noise and interferences	2.1 Thermal Noise 2.2 Antenna Noise 2.3 Noise Factor and noise temperature of a receptor 2.4 Concept and types of interferences 2.5 Characterisation of the interference 2.6 Concept of availability, fading and diversity 2.7 Systems limited by noise and by interference
3. Link budget for different propagation modes	3.1 Propagation in low frequencies. Surface and ionospheric waves. Electrical field received. 3.2 Tropospheric propagation. 3.3 Propagtion losses
4. Design of Radionavigation systems	4.1 Fundamentals of radionavigation 4.2 Types of radionavigation systems 4.3 Satellite radionavigation systems 4.4 Design of a radionavigation system
5. Design of radar systems	5.1 Fundamentals of radar systems. Radar cross section 5.2 Types of radar systems 5.3 Design of a radar system

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	20	20	40
Seminars	4	24	28
Laboratory practises	13	13	26
Short answer tests	1	10	11
Long answer tests and development	1	10	11
Other	1	8	9

*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 contents of the subject; it includes exhibition of concepts; introduction of practices and exercises; and resolution of problems and/or exercises in ordinary classroom.
Seminars	Teaching for few students; they participates very actively in the evolution of the classes deepening in a specific subject, expanding it and relating it with contents oriented to the professional practice. These activities can have related a load of autonomous work of the student.
Laboratory practises	Application, to practical level, of the knowledges and skills adquired in the theoretical classes, by means of practices realised with equipment of test and measure. Also including practical of laboratory realised on computers (simulations, analysis, processed, etc.), exercises of programming, on-line realised works, etc.

Personalized attention

Methodologies	**Description**
Master Session	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.
Seminars	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.
Laboratory practises	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.
Tests	**Description**
Short answer tests	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.
Long answer tests and development	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.
Other	The students will have occasion to attend to personalised tutorials in the office of the professor in the schedule that the professors will establish for this effect to principle of course and that will publish in the page of the subject They will be able to also arouse his queries by telematic way.

Assessment

	Description	Qualification
Short answer tests	Final examination: it consists in a proof for the evaluation of the competencies adquired by the students by means of the resolution of simple problems and short questions of theory.	50
Long answer tests and development	Final exam: it consists in a proof for the evaluation of the competencies adquired by the students. They will have to develop, organise and present the knowledges adquired during the course.	20
Other	Participation in activities by part of the students, especially of the practices. This section corresponds to the continuous evaluation of the student.	30

Other comments on the Evaluation

In all the proofs the competencies To2, To4, To20, To21 and To23 are valued.

In accordance with
the memory of the title, and since, in fulfillment of
the rule of
the University of Vigo, a student that do not opt by continuous evaluation
can obtain the maximum qualification by means of the final examination, the final examination, that will consist of
the proof of short answer and the proof of development will be able to
represent between 70% for the students that opt by continuous
evaluation and 100% of the final note in case of not opting by
the continuous evaluation.

Sources of information

Marcos Arias Acuña, Oscar Rubiños López, Radiocomunicación, 1a, Andavira Editora, 2011

Recommendations

Subjects that continue the syllabus

(*)Antenas/V05M145V01222
(*)Laboratorio de Radio/V05M145V01223
(*)Satélites/V05M145V01321
(*)Sistemas Radio en Banda Ancha/V05M145V01322