Universida_{de}Vigo

Subject Guide 2023 / 2024

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IDE	NTIFY	ING DATA	
Rad	diocom	nmunication	
Sub	ject	Radiocommunication	
Coc	le	V05M145V01103	
Stu	dy	Máster Universitario	
pro	gramm	e en Ingeniería de	
Des	criptor	s ECIS Credits Choose Year	Quadmester
	- I	5 Mandatory 1st	lst
lea	ching	Spanish	
lang	guage	~+	
Dep	artmer	nil Arias Asuña, Alberte Marses	
	turorc	Arias Acuía, Alberto Marcos	
Lec	lurers	González Valdés Boria	
		Rubiños López José Óscar	
F-m	ail	marcos@com uvigo es	
We	h	http://moovi.uvigo.cs	
Ger	eral	In this compulsory matter of first semester, the student familiarises with the radioco	mmunication systems.
des	criptior	n beginning with the antenna properties, continuing with the study of the noise and ir	iterferences and finalising
		with the calculation of the link budget in different propagation scenarios.	j
		These concepts apply to the study of the services of radar and radiolocalization.	
Tra	ining a	and Learning Results	
Coc	le		
A2	CB2 S broad	Students must apply their knowledge and ability to solve problems in new or unfamilia der (or multidisciplinary) contexts related to their field of study.	ar environments within
A4	CB4 S	Students must communicate their conclusions, and the knowledge and reasons stating specialists in a clear and unambiguous way.	g them-, to specialists and
C2	CE2 A	Ability to develop radio communication systems: antenna, equipment and subsystems	design; channel modeling;
	link b	oudgeting; and planning.	
C3	CE3 A	Ability to implement systems by cable, line, satellite, in fixed and mobile communicati	on environments.
C5	CE5 A	Ability to design systems of radio navigation and positioning, as well as radar systems	
Exc	ected	results from this subject	
Exp	ected r	results from this subject	Training and
Car	acity +	o realise basic antenna designs	
Cap		o realise basic allerina designs	C2
Car	acity to	o calculate link budgets taking into account both signal and perturbations in distinct s	
Եսի	acity to	o calculate link badgets taking into account both signal and pertarbations in distinct s	C2
			C3
Car	acity to	o design radionavegation and positioning systems	A4
		······································	C3
			C5
Cap	acity to	o design radar systems	A4
•	-		C5

Contents	
Торіс	
1. Basic design of antennas	1.1 Electromagnetic Foundations
	1.2 Antennas
	1.3 Friis formula
	Competitions related: CB2, *CE2

2. Models of noise and interferences	 2.1 Thermal Noise 2.2 Noise of antenna and receptor 2.3 Interferences 2.4 Availability, fading and diversity 2.5 Radio systems limited by noise and by interference Competitions related: CB2, CE2, CE3
3. Calculation of links in distinct stages of propagation	3.1 Propagation in low frequencies3.2 Propagation in high frequenciesCompetitions related: CB2,CE2
4. Design of systems of *radionavegación	4.1 Radionavegation systems foundations and types4.2 Satellite radionavegation systemsCompetitions related: CB4, CE3, CE5
5. Design of systems radar	5.1 Foundations and types of radar system. Radar cross section.5.2 Design of a radar systemsCompetitions related: CB4, CE5

Planning				
	Class hours	Hours outside the classroom	Total hours	
Lecturing	18	36	54	
Seminars	5	20	25	
Laboratory practical	14	14	28	
Problem and/or exercise solving	1	8	9	
Essay questions exam	1	8	9	
*The information in the planning table is for	r guidance only and does no	ot take into account the het	erogeneity of the students.	

Methodologies	
	Description
Lecturing	Exhibition of the contained of the subject; it includes exhibition of concepts; introduction of practices and exercises; and resolution of problems and/or exercises in common classroom.
	With this methodology will work the competencies CB2, CE2, CE3 and CE5
Seminars	Teaching in small rooms, in the that the student takes part very actively in the evolution of the kinds deepening in one specific item, enlarging and relating with contents guided to the professional practice; including the participation in scientific events and/or conferences, organized or not in the own School; the organisation of enabling debates compare ideas and proposals, guided by the teacher, both physically and online; and the study of cases/analysis of situations (analysis of a problem or real case, with the aim to know it, interpreted, resolved, generate hypothesis, diagnosed and deepening in alternative procedures of solution, to see the application of the theoretical concepts in the reality). These activities can had related a lot of autonomous work of the student.
	With this methodology will work the competencies CB4, CE2, CE3 and CE5
Laboratory practical	Application, to practical level, of the knowledges and skills purchased in the theoretical kinds, by means of practices realized with equipment of test and measure, both in the laboratory or of field. Also including practices of laboratory realized on computers (simulation, analysis, processing, etc.), exercises of programming, works realized online, etc.
	With this methodology will work the competencies CB2, CE2 and CE5

Personalized assistance			
Methodologies	Description		
Lecturing	In this methodology, all the questions that each student can ask will be answered.		
Seminars	Each student will be attended in an individual way.		
Laboratory practical	Each student will be attended in an individual way.		

Assessment				
	Description	Qualificati	on Tra L	ining and earning
			F	Results
Laboratory practical	Students during the course participate in individual or group practices and perform individual jobs. The individual note for each student of this item is that corresponding to the continuous evaluation and I can be worth up to 30% of the final score.	30 e	A2 A4	C2 C3 C5

Problem and/or exercise solving	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.	40	A2 A4	C2 C5
Essay questions exam	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.	30	A2 A4	C2 C5

Other comments on the Evaluation

Students during the course participate in individual or group practices and do individual work within the continuous assessment. The individual grade can account for up to 30% of the final grade. In the continuous assessment, attendance at practices is mandatory, although there is no minimum number of papers submitted to obtain a grade.

The continuous evaluation will additionally consist of a written exam on the first two topics that will mean up to 30% of the mark.

All students must take the final exam on the date set by the center, which will consist of a single test for students in continuous assessment. Students who take the global evaluation will also have to take a test equivalent to the partial exam.

To pass the subject it is necessary to get a minimum of 4 out of 10 in the two written exams. If this minimum is not exceeded, the maximum rating that could be obtained would be 4.9.

The final mark, both in the ordinary and in the extraordinary, will be the highest between the mark of the written exams and the sum of the continuous evaluation mark including that of the final exam.

Any person enrolled in this subject who receives either of the two written exams will be considered submitted.

In the event of detection of plagiarism in any of the work/tests carried out, the final grade for the subject will be "Fail (0)" and the teachers will notify the school management of the matter so that they can take the appropriate measures.

Sources of information

 Basic Bibliography

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

 José María Hernando Rábanos, Transmisión por Radio, 6a, Editorial Universitaria Ramón Areces, 2008

 John Griffits, Radio Wave Propagation and Antennas. An Introduction, 1st, Prentice Hall, 1985

 Complementary Bibliography

 Robert R. Collin, Antennas and Radiowave Propagation, 1st, Mc Graw Hill, 1985

 Thomas A.Milligan, Modern Antenna Design, 2nd, Wiley, 2005

 ngel Cardama, L. Jofre, J.M. Rius, S. Balnch, M. Ferrando, Antenas, 2a, Ediciones UPC, 2002

 Constantine A. Balanis, Antenna Theory. Analysis and Design, 3rd, Wiley, 2005

 ITU-R, Recommendations,

Recommendations Subjects that continue the syllabus Antennas/V05M145V01208 Radio Laboratory/V05M145V01209 Satellites/V05M145V01311 Wideband Radio Systems/V05M145V01312