Universida_{de}Vigo

Subject Guide 2013 / 2014

IDENTIFYIN	IG DATA			
(*)Técnicas	de transmisión e recepción de sinais			
Subject	(*)Técnicas de			
	transmisión e			
	recepción de sinais			
Code	V05G300V01404			
Study	(*)Grao en			
programme	Enxeñaria de			
	lecnoloxias de			
Descriptors		Choose	Year	Quadmester
_	6	Mandatory	2nd	2nd
Teaching	Spanish			
Doportroom				
Department	Lánaz Valagues Deberte			
	Lopez Valcarce, Roberto			
Lecturers	Fernandez Barciela, Monica			
	Gonzalez Preicic, Nuria			
	Isasi de vicente, Fernando Guillermo			
	Lopez Valcarce, Roberto			
	Marquez Florez, Oscar Willian			
	Rodriguez Banga, Eduardo			
E-mail	Valcarce@gts.uVigo.es			
Web	http://faitic.uvigo.es			
description	methods for the exchange of information in digital f amplitude modulation (PAM) as illustrative example are described, as well as the different effects cause performance parameters of a digital system.	ormat at the physic . The main compone d by the communica	al layer level. Its ents of a digital f ation channel an	main focus is on pulse transmitter and receiver d the different
Comnetenc	ies			
Code				
	he knowledge of basic subjects and technologies that	t canacitates the stu	Ident to learn ne	w methods and
technol	onies as well as to give him great versatility to conf	ront and undate to i	new situations	
	be ability to solve problems with initiative to make c	reative decisions an	d to communica	te and transmit
knowle	dge and skills, understanding the ethical and profess	sional responsibility	of the Technical	
Engine	er activity.	ional responsionity	or the reenhed	
	be aptitude to manage mandatory specifications, pro	cedures and laws		
A16 CE7/T2	The ability to use communication and software and	lications (ofimatics	databases adva	anced calculus project
manad	ement visualization etc.) to support the development	nt and operation of	Flectronics and	Telecommunication
networl	content, visualization, etc., to support the development services and applications	ine and operation of		
A18 CF9/T4	The ability to analyze and specify the main parame	ters of a communic	ations system	
A10 CE10/T	5: The ability to evaluate the advantages and disady	antages of different		Iternatives in the
implem digital a	entation and deployment of communication systems and analogical modulation systems.	s from the point of v	iew of signals, p	erturbations, noise and
A29 CE20/T	15: The knowledge of national, European and interna	ational telecommuni	cation regulatio	ns and laws.
Learning ai	ms			
Expected res	sults from this subject			Training and Learning Results
Ability to use project mana networks se	e communication and office computer applications (c agement, visualisation tools, etc.) to support the dev ryices, and telecommunication and electronics appli	latabases, advanced elopment and explo	d computation, A bitation of	16

Ability to analyse and specify the fundamental parameters of a communications system.

A18

Ability to evaluate the advantages and drawbacks of different technological alternatives for the deployment or implementation of analog and digital communication systems, from the signal space point of view, and taking into account the perturbations and the noise.	A19
Knowledge of basic technologies that enable the student to learn new methods and techniques,	A3
with the flexibility required to adapt to new situations.	
Ability to solve problems with initiative, decision making, and creativity.	A4
Familiarity with telecommunication regulations and standards at the national, European and world	A29
levels.	
(*)	A6

Contents	
Торіс	
1. Introduction to digital communication systems	-Basic elements and general description of a communication system. -Analog and digital communications -Description of a digital transmitter -Description of a digital receiver
2. Signals, systems and stochastic processes in communications	 -Review of basic concepts: signals, systems, transforms. -Autocorrelation function of a stochastic process. -Power spectral density. Transmitted power, transmission bandwidth. -Noise characterization
3. Frequency conversion and analog processing	 -Amplitude modulation (AM): with large carrier, with suppressed carrier -I/Q Modulation and demodulation. - Transceiver requirements and specifications -Receiver architectures: direct conversion, intermediate frequency. Analog and digital stages.
4. Pulse amplitude modulation (PAM)	 Baseband PAM Bandlimited channels and intersymbol interferences (ISI) Nyquist criterion, raised cosine pulses, eye diagram Bandpass PAM
5. Modulation and detection in Gaussian channels	s -Introduction to the Signal Space -Derivation of the Matched Filter -Maximum A Posteriori (MAP) and Maximum Likelihood (ML) detectors -Probability of error
6. The communication channel	-Transmission media -Signal to noise ratio -Multipath and frequency selectivity -Fading -Doppler effect

Planning			
	Class hours	Hours outside the classroom	Total hours
Master Session	25	25	50
Practice in computer rooms	16	16	32
Troubleshooting and / or exercises	2	19	21
Laboratory practises	10	10	20
Long answer tests and development	2	18	20
Short answer tests	1	6	7
*The information in the planning table is for	guidance only and does no	ot take into account the het	erogeneity of the students.

Methodologies	
	Description
Master Session	Presentation and discussion of the fundamental theory
Practice in computer	The concepts presented in class will be further illustrated and developed by means of Matlab-based
rooms	simulation and signal processing tools
Troubleshooting and / o	or Students will be given different take-home sets of problems. The answers to selected problems will
exercises	be provided later on.
Laboratory practises	Experimental study of the different components and effects in analog transmitter/receiver
	frontends

Personalized attention		
Methodologies	Description	
Laboratory practises	Student aid will be provided during office hours as well as on-line (email, chat). On-line discussion forums will be set up for each chapter, through the usual e-learning platform.	

Master Session	Student aid will be provided during office hours as well as on-line (email, chat). On-line discussion forums will be set up for each chapter, through the usual e-learning platform.
Practice in computer rooms	Student aid will be provided during office hours as well as on-line (email, chat). On-line discussion forums will be set up for each chapter, through the usual e-learning platform.
Troubleshooting and / or exercises	Student aid will be provided during office hours as well as on-line (email, chat). On-line discussion forums will be set up for each chapter, through the usual e-learning platform.

Assessment

	Description	Qualification
Long answer tests and development	Final examination	60
Short answer tests	Three short tests will be given during the semester	40

Other comments on the Evaluation

For those students that opt for continuous evaluation:

- Final Exam: 60%
- Three short tests: 40% (10% the first one, 15% each of the other two)

(approximately in weeks 5, 9 and 14). Results will be announced within a reasonable time. If a student does not show up, the instructors have no obligation to reschedule the test for him/her. Each short test will cover the material from the beginning of the semester to the previous week.

For those students that do not opt for continuous evaluation:

- Final Exam: 100%

Any student showing at any of the tests (short tests or final exam) will be assigned a grade. Any student showing at any of the short tests will be graded under the continuous evaluation format. The grade of any student that only shows at the final exam will be the grade of the final exam.

Students that choose the continuous evaluation format as specified above and do not pass the course will be assigned the grade "fail" regardless of any potential no-shows.

The short tests grades will be kept for the second call, if the case, but they will not be kept for future years. In the second call, students will be allowed to opt out of the continuous evaluation format.

Sources of information
C.R. Johnson Jr., W.A. Sethares, Telecommunication Breakdown , 1,
A. Artés, F. Pérez González et al., Comunicaciones Digitales, 1,
Leon W. Couch, Digital & Analog Communication Systems, 7,
Bernard Sklar, Digital Communications: Fundamentals and Applications, 2,
J. G. Proakis, M. Salehi, Fundamentals of Communication Systems, 1,
B. Razavi, RF Microelectronics , 1,
Bernard Sklar, Digital Communications: Fundamentals and Applications , 2, J. G. Proakis, M. Salehi, Fundamentals of Communication Systems , 1, B. Razavi, RF Microelectronics , 1,

Recommendations

Subjects that continue the syllabus

(*)Principios de comunicacións dixitais/V05G300V01613

Subjects that it is recommended to have taken before

(*)Física: Análise de circuítos lineais/V05G300V01201
(*)Matemáticas: Probabilidade e estatística/V05G300V01204
(*)Procesado dixital de sinais/V05G300V01304

Other comments

It is assumed that the student has basic knowledge of analog and digital signal processing, as well as of probability and statistics.