UniversidadeVigo

Subject Guide 2023 / 2024

IDENTIFYIN	IG DATA		
Imaging Sy	stems		
Subject	Imaging Systems		
Code	V05G306V01332		
Study	Bachelor Degree in		
programme	Telecommunication		
	I echnologies		
Descriptors	Engliteening (DTTE)		Ouadmostor
Descriptors	CISCIEURS CHOOSE Teal		Quadimester
Tooching	0 Optional Stu		2110
language	English		
Department			
Coordinator	Martín Herrero, Julio		
	Martín Herrero, Julio		
E-mail	iulio@uviao es		
Web	http://moovi uvigo.es		
General	The study of several families of systems of generation of images including artifici	ial vision r	emote sensing and
description	medical image.		enfoce sensing and
	English Friendly subject: International students may request from the teacher: a)	materials a	and bibliographic
	references in English, b) tutoring sessions in English, c) exams and assessments i	n English.	5 1
Training ar	d Learning Results		
Code			
B3 CG3: TI	ne knowledge of basic subjects and technologies that enables the student to learn	new meth	ods and
technol	logies, as well as to give him great versatility to confront and adapt to new situation	ons	
B4 CG4: TI	ne ability to solve problems with initiative, to make creative decisions and to comr	municate a	nd transmit
knowle	dge and skills, understanding the ethical and professional responsibility of the Tec	hnical Tele	ecommunication
Engine	er activity.		
B7 CG7: TI	ne ability to analyze and assess the social and environmental impact of technical s	solutions.	
B10 CG10 T	he ability for critical reading of scientific papers and docs.		
C34 CE34/S	I1The ability to construct, exploit and manage telecommunication services and ap	plications,	such as receiving,
digital a	and analogical treatment, codification, transporting and representation, processing	g, storage,	reproduction,
manag	ement and presentation of audiovisual and multimedia information services.		
C66 (CE66/0	JP9) The ability for selection of circuits, subsystems and systems of remote sensir	ng.	
Expected r	esults from this subject		
Expected res	sults from this subject	Tra	ining and Learning
			Results
Know most o	common imaging (capture) systems for medical diagnosis, essay and remote sensi	ing. B3	C34
		B10	<u>C66</u>
Understand	the principles of operation of such systems.	B3	C34
		B10	<u> </u>
Knowledge a	about the most common applications of such systems.	B3	C34
Kanadadaa	have the second Webba and Webba and for the second second	B10	<u> </u>
Knowledge a	about the capabilities and limitations of such systems.	B3	C34
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io understal	nu the role of the engineer as a generator of technology on the dasis of scientific	R3	
auvances.		D4 R7	
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Combrant			
Contents			
горіс			

Computer vision systems	Illumination systems (LED, laser, fluorescent), monochrome cameras, Bayer and 3 CCD color cameras, matrix and line cameras, framegrabbers, multicamera systems (mono/stereo)
Medical image and non destructive testing (NDT) systems	Generation and processing of echography, X-ray, computerized axial tomography, nuclear magnetic resonance, and positron emission scanner.
Satellital, airborne and proxy remote sensing	Acquisition, processing and applications of panchromatic images, monoband, multispectral, and hyperspectral, active and passive in UV / VIS / SWIR / NIR / FIR / Thermal / GHz, Radar and Lidar.

Planning			
	Class hours	Hours outside the classroom	Total hours
Practices through ICT	17.6	35.2	52.8
Mentored work	0	35.2	35.2
Lecturing	21	21	42
Essay questions exam	2	8	10
Systematic observation	0.01	0	0.01
Presentation	2	8	10
Essay	0.01	0.01	0.02
*The information in the planning table is	for guidance only and does no	ot take into account the het	erogeneity of the students.

1ethodologies	
	Description
Practices through ICT	Handling and tuning analytic tools and algorithms, identifying which ones to use in different scenarios. We will work mainly in C/C++. Competencies: CG3, CG10, CE34, CE66.
Mentored work	Personal work on the fundamentals, functioning and state of the art of a given imaging system. All competences are addressed.
Lecturing	Master talks by the teacher on central topics, promoting critical discussion of concepts. All learning aims are addressed.

ersonalized assistance	
Methodologies	Description
Practices through ICT	Doubts can be solved in the teacher's office hours, individually or in small groups. Except otherwise noted, upon previous appointment with the teacher via email, preferably in the schedules and location officially reserved.
Assessment	

Description	Qualification	Trai	ning and
		Learn	ing Results
Essay questions exam All teaching aims specified in the corresponding section of this guide	100	B3	C34
are evaluated.		B10	C66
Systematic Personalized follow-up of the work of the student in the laboratory,	50	B3	C34
observation with feedback. All competences are evaluated.		B10	C66
Presentation Presentation to the classroom of the personal work, and attitude and	25	B3	C34
participation in the presentations of their classmates.		B10	C66
Essay Content and quality of the personal work.	25	B3	C34
		B10	C66

Other comments on the Evaluation

The assistance to class under continuous evaluation is compulsory, unless exceptional circumstances concur. Continuous evaluation is used for assessment, based on the work of the student. There is a final exam in the official date marked by the Board of School in May, for those students that have not passed the continuous evaluation. This final exam will be marked between 0 and 10 points. It covers all the subjects seen during the semester. To approve, the student has to obtain, at least, five points. Students wishing to improve their continuous evaluation marks can also attend the final exam: in this case the mark of this exam will be the final mark. The students that have passed the continuous evaluation and are satisfied with their mark do not need to attend the final exam. Along the semester the students will receive feedback on their progress, and the final mark of continuous evaluation will be communicated to the students well before the final exam. The delivery of the personal work the last week of class will imply the official participation in continuous evaluation. The extraordinary evaluation neither the final exam in May. The final mark will be the mark of the extraordinary final exam in both cases. This extraordinary final exam will be marked between 0 and 10 points, and covers all the subjects. To approve, the student has to obtain, at least, five points. Note that there are two final exams, but both correspond to a single and the same call

Sources of information
Basic Bibliography
Erik Reinhard et al., Color Imaging: Fundamentals and Applications, 1ª, A K Peters, 2008
John Robert Schott, Remote Sensing: The Image Chain Approach, 1ª, Oxford University Press, 2007
Michael Vollmer and Klaus-Peter Möllmann, Infrared Thermal Imaging: Fundamentals, Research and Applications,
1ª, Wiley-VCH, 2010
Arnulf Oppelt, Imaging Systems for Medical Diagnostics, 2ª, Wiley-VCH, 2005
Complementary Bibliography
Oleg S. Pianykh, Digital Imaging and Communications in Medicine (DICOM), 2ª, Springer, 2012
Recommendations

Subjects that are recommended to be taken simultaneously

Fundamentals of Image Processing/V05G301V01333

Other comments

Simultaneously taking the subject Fundamentals of Image Processing is highly recommended.

Abundant digital bibliographic material will be provided to the students through the subject's web, covering all the subject matter in the program.