# Universida<sub>de</sub>Vigo

Subject Guide 2024 / 2025

IDENTIFYIN	G DATA				
Fundament	als of Image Processing				
Subject	Fundamentals of				
Code	V05G301V01333				
Study	Grado en Ingeniería				
programme	de Tecnologías de				
	Telecomunicación				
Descriptors	ECTS Credits Choose	Year		Quadmes	ster
	6 Optiona	al 3rd		2nd	
Teaching	#EnglishFriendly				
language	Spanish				
Department	Martín Harrana I.V.				
Coordinator	Martín Herrero, Julio				
Lecturers	Martin Herrero, julio				
	Julio@uvigo.es				
General	Introduces to the student the basics of digital image processing				
description	English Friendly subject: International students may request from	n the teachers: a)	materials a	and biblio	graphic
	references in English, b) tutoring sessions in English, c) exams a		i English.		
Training an	d Learning Results				
Code					
B3 CG3: Th	e knowledge of basic subjects and technologies that enables the	student to learn i	new metho	ds and	
technol	ogies, as well as to give him great versatility to confront and ada	pt to new situatio	ns		
B4 CG4: Th	e ability to solve problems with initiative, to make creative decis	ions and to comm	unicate and	d transmit	:
knowled Engined	dge and skills, understanding the ethical and professional responser activity	sibility of the Tech	nical Telec	ommunica	ation
B10 CG10 T	he ability for critical reading of scientific papers and docs.				
C34 CE34/SI	1The ability to construct, exploit and manage telecommunication	services and app	lications, s	uch as red	ceiving,
digital a	and analogical treatment, codification, transporting and represent	tation, processing	, storage, re	eproductio	on,
manage	ement and presentation of audiovisual and multimedia informatio	n services.	_	-	
C38 CE38/S	5 The ability to create, modify, manage, broadcast and distribute	e multimedia conte	ents taking	into acco	unt the
use and	l accessibility criteria to audiovisual, broadcasting and interactive	e services.			
D2 CT2 Un	derstanding Engineering within a framework of sustainable devel	opment.			
Expected re	esults from this subject				
Expected res	sults from this subject		Train	ing and L	earning
				Results	-
Understand	the nature and organisation of digital images		B3	C34	
	10 - 10 - 10 -		<u>B10</u>	<u>C38</u>	
Learn to pro	cess digital images		B3	C34	D2
			64 B10	C30	
Learn how to	program a computer to process a digital image		B10	(3/	
	program a computer to process a digital image		B3	C38	DZ
			B10		
Understand	now the fundamental technics of image processing work		B3	C34	
			<u>B1</u> 0	C38	
Apply fundar	nental processing technics to solve specific problems with image	s or groups of ima	iges B3	C34	
			B4	C38	

# Contents Topic GUI programming

Planning				
	Class hours	Hours outside the classroom	Total hours	
Practices through ICT	19.6	78.4	98	
Lecturing	21	21	42	
Systematic observation	0.01	0	0.01	
Laboratory practice	2	8	10	
*The information in the planning table i	s for quidance only and does no	t take into account the het	erogeneity of the studer	nts

Methodologies	
	Description
Practices through ICT	Handling and tuning analytic tools and algorithms, identifying which ones to use in different scenarios. All learning aims are addressed.
Lecturing	Master talks by the teacher on central topics, promoting critical discussion of concepts. All learning aims are addressed.

Personalized assistance			
Methodologies	Description		
Practices through ICT	Implementation of image processing methods within an image processing and visualization framework with graphic user interface, programming in C and C++. Doubts are solved in the classroom and in private sessions.		

Assessment					
	Description	Qualificatior	Trainir	ng and Le	arning
				Results	
Practices through ICT	Personalised monitoring of the student's work, with feedback. All teaching aims specified in the corresponding section of this guide are evaluated.	100	B3 B4 B10	C34 C38	D2
Systematic observation	Personalised monitoring of the student's work, with feedback. All teaching aims specified in the corresponding section of this guide are evaluated.	100	B3 B4 B10	C34 C38	D2
Laboratory practice	Final exam.	100	B3 B4 B10	C34 C38	D2

## 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 of July will be an extraordinary final exam, for those students that have not passed neither the continuous 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 ("convocatoria").

## Sources of information

# **Basic Bibliography**

Rafael C. Gonzalez, Richard E. Woods, **Digital Image Processing**, 3<sup>a</sup>, Prentice Hall, **Complementary Bibliography** Robert Laganière, **OpenCV Computer Vision Application Programming Cookbook**, Packt Publishing, 2014 Jasmin Blanchette, Mark Summerfield, **C++ GUI Programming with Qt 4**, Prentice Hall, 2008

## Recommendations

#### Subjects that are recommended to be taken simultaneously

Imaging Systems/V05G301V01332

#### Subjects that it is recommended to have taken before

Programming I/V05G301V01105 Programming II/V05G301V01110

#### **Other comments**

Simultaneously taking the subject Imaging Systems is emphatically recommended. You also should have passed the subject Programming, or have some notions of, at least, C programming.