Universida_{de}Vigo

IDENTIFYING DATA
Fundamentals of Image Processing

Subject	Fundamentals of Image Processing			
Code	V05G301V01333			
Study programme	Grado en Ingeniería de Tecnologías de Telecomunicación			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Martín Herrero, Julio			
Lecturers	Martín Herrero, Julio			
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General description	Introduces to the student the basics of digital image processing. English Friendly subject: International students may request from the teachers: a) materials and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.			

Training and Learning Results

Code	
B3	CG3: The knowledge of basic subjects and technologies that enables the student to learn new methods and technologies, as well as to give him great versatility to confront and adapt to new situations
B4	CG4: The ability to solve problems with initiative, to make creative decisions and to communicate and transmit knowledge and skills, understanding the ethical and professional responsibility of the Technical Telecommunication Engineer activity.
B10	CG10 The ability for critical reading of scientific papers and docs.
C34	CE34/SI1The ability to construct, exploit and manage telecommunication services and applications, such as receiving, digital and analogical treatment, codification, transporting and representation, processing, storage, reproduction, management and presentation of audiovisual and multimedia information services.
C38	CE38/SI5 The ability to create, modify, manage, broadcast and distribute multimedia contents taking into account the use and accessibility criteria to audiovisual, broadcasting and interactive services.
D2	CT2 Understanding Engineering within a framework of sustainable development.

Expected results from this subject

Expected results from this subject	Training and Learning Results		
Understand the nature and organisation of digital images	B3 B10	C34 C38	
Learn to process digital images	B3 B4 B10	C34 C38	D2
Learn how to program a computer to process a digital image	B3 B4 B10	C34 C38	D2
Understand how the fundamental technics of image processing work	B3 B10	C34 C38	
Apply fundamental processing technics to solve specific problems with images or groups of images	B3 B4	C34 C38	

Contents

Topic	
GUI programming	.

Basic preprocessing.	.		
Image restoration.	.		
Global and local operators.	.		
Linear and nonlinear filters.	.		
Segmentation	.		
Mathematical morphology.	.		

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 is for guidance only and does not take into account the heterogeneity of the students.

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	Qualification	Training and Learning 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**, 3ª, 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.