SUBJECT TEACHING GUIDE

M1546 - Image Processing and Analysis

Master's Degree in Physics, Instrumentation and the Environment

Academic year 2016-2017

1. IDENTIFYING DATA					
Degree	Master's Degree in Physics, Instrumentation and the Environment			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline	Specializing in Instrumentation and Computation Image Processing and Analysis				
Course unit title and code	M1546 - Image Processing and Analysis				
Number of ECTS credits allocated	5	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. FISICA APLICADA
Name of lecturer	PEDRO JOSE VALLE HERRERO
E-mail	pedro.valle@unican.es
Office	Facultad de Ciencias. Planta: + 3. LABORATORIO - OPTICA CUANTICA 3039 (3039)
Other lecturers	MANUEL PEREZ CAGIGAL PATRICIO VIELVA MARTINEZ DIEGO HERRANZ MUÑOZ

3.1 LEARNING OUTCOMES
- Students know current techniques about acquisition, storage, processing and analysis of images.
- Students analyze optical systems for image formation from the electromagnetic basis of light.
- Students use algorithms to image enhancement necessary to extract relevant information of images.
- Students are able to independently address problems in the field of image processing, and communicating results in a useful and efficient manner.

4. OBJECTIVES

Understanding the basics of imaging and optical systems behavior under the electromagnetic theory of light.
Ability to calculate and analyze the response of optical systems using Fourier techniques.
Know the principles and techniques of acquisition, digitizing and storing images.
Perform basic operations of digital image processing (preprocessing).
Ability to integrate into professional groups or research work requiring knowledge of image processing.
Ability to continue learning in the field of data analysis independently.
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6. COURSE ORGANIZATION

	CONTENTS
1	Electromagnetic theory of optical systems. Digital image processing.
2	Basic images analysis. Advanced image analysis.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exam	Written exam	Yes	Yes	30,00
Laboratory reports.	Work	No	Yes	40,00
Oral presentations.	Others	No	No	20,00
Experimental work.	Laboratory evaluation	No	No	10,00
TOTAL				100,00

Observations

The image processing practices are computing practices that are evaluated in the laboratory monitoring and requested written reports.
The written exam may be replaced by a written report and an oral presentation it.

Observations for part-time students

Part-time students can perform computing practices in non-contact way and laboratory evaluation (10%) can be replaced by written examination.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

"Introduction to Fourier Optics", J. W. Goodman (McGraw-Hill)

“Digital Image Processing”, R.C. González and R.E. Woods (Prentice Hall)

“A wavelet tour of signal processing. The sparse way”, S. Mallat, 3rd Ed. 2009 (Elsevier)

"Introduction to wavelets and wavelet transforms. A premier", C.S. Burrus et al. 1998 (Prentice Hall)