Teaching Guide				
Identifying Data				2023/24
Subject (*)	Image Description and Modeling		Code	614535004
Study programme	Máster Universitario en Visión por Computador			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Obligatory	6
Language	English			
Teaching method	Hybrid			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da Información			
Coordinador	Rouco Maseda, Jose	E-mail	jose.rouco@udc.es	
Lecturers	De Moura Ramos, Jose Joaquim Rouco Maseda, Jose	E-mail	joaquim.demoura@udc.es jose.rouco@udc.es	
Web				
General description	The aim of this course is to become familiar with the fundamental characteristics of the digital image and its forms of representation, the description of visual content through local characteristics of colour, shape and texture, and the practical application of these concepts to problems of image processing and analysis.			

Study programme competences / results	
Code	Study programme competences / results
A1	CE1 - To know and apply the concepts, methodologies and technologies of image processing
B1	CB6 - To possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
B2	CB7 - That students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study
B6	CG1 - Ability to analyze and synthesize knowledge
B8	CG3 - Ability to develop computer vision systems depending on existing needs and apply the most appropriate technological tools
C1	CT1 - Practice the profession with a clear awareness of its human, economic, legal and ethical dimensions and with a clear commitment to quality and continuous improvement
C2	CT2 - Ability to work as a team, organize and plan

Learning outcomes			
Learning outcomes	Study programme competences / results		
To know the fundamental characteristics of digital image and its forms of representation.	AC1	BC1 BC2 BC6 BC8	CC1 CC2
Description of visual content through local characteristics of colour, shape and texture.	AC1	BC1 BC2 BC6 BC8	CC1 CC2
To apply image modelling and representation techniques to image processing and analysis problems.	AC1	BC1 BC2 BC6 BC8	CC1 CC2

Contents

Topic	Sub-topic
Image representation and modeling: space-frequency, orientation and phase, space-scale	
Wavelets and filter banks	
Image coding and reconstruction	
Description of colour, shape and texture	
Image modelling and description applications	

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 B1 B2 B6 B8 C1 C2	10	20	30
Case study	A1 B1 B2 B6 B8 C1 C2	4	16	20
Objective test	A1 B1 B2 B6 B8 C1 C2	2	0	2
Laboratory practice	A1 B1 B2 B6 B8 C1 C2	16	32	48
Research (Research project)	A1 B1 B2 B6 B8 C1 C2	10	40	50
Personalized attention		0		0
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Participatory lessons with the aim of learning the theoretical content of the subject
Case study	Elaboration and presentation of selected state-of-the-art methodologies related to the subject.
Objective test	Continuous self-evaluation tests during the course. Evaluation by examination at the end of the course as an alternative.
Laboratory practice	Analysis and resolution of practical cases with the aim of strengthening the practical application of the theoretical content. Practice in computer classrooms, learning based on the resolution of practical cases, autonomous work and independent study of the students, and group work and cooperative learning.
Research (Research project)	Learning based on the resolution of practical cases, autonomous work and independent study of the students, and group work and cooperative learning.

Personalized attention	
Methodologies	Description
Case study Laboratory practice Research (Research project)	< br>Resolution of doubts during laboratory practices. Individualized advice during research projects and case studies.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Case study	A1 B1 B2 B6 B8 C1 C2	Elaboration and presentation of works on selected state-of-the-art methodologies	15
Objective test	A1 B1 B2 B6 B8 C1 C2	Continuous self-evaluation tests during the course. Evaluation by examination at the end of the course as an alternative	25

Laboratory practice	A1 B1 B2 B6 B8 C1 C2	Analysis and resolution of practical cases with the aim of strengthening the practical application of theoretical content	40
Research (Research project)	A1 B1 B2 B6 B8 C1 C2	Resolution of practical cases of application of the subject through autonomous work of the student, and using the techniques learned during the course	20

Assessment comments
The evaluation corresponding to the objective test may be passed by means of the tests scheduled during the course or by means of the final exam.

Sources of information	
Basic	Bovik, Alan. "The essential guide to image processing". 1st Edition, 2009. ISBN: 978-0-12-374457-9.Bovik, Alan (Ed.). "Handbook of image and video processing". 2nd Edition, 2005. ISBN: 978-0-12-119792-6.Mallat, Stephane. "A wavelet tour of signal processing: The sparse way". 3rd Edition, 2009. ISBN: 978-0-12-374370-1.Nixon, Mark. "Feature extraction and image processing for computer vision". 3rd Edition, 2012. ISBN: 9780123965493.Sonka, M; Hlavac, V.; Boyle, R. "Image Processing, Analysis, and Machine Vision". 3rd Edition, 2009. ISBN: 978-0-49-508252-1.Forsyth, David A; Ponce, Jean. ?Computer Vision: A Modern Approach?. Pearson. 2nd Edition, 2012. ISBN: 978-0-13608-592-8.Szeliski, Richard. ?Computer Vision: Algorithms and Applications?. Springer. 1st Edition, 2010. ISBN 978-1-84882-934-3.Petrou, Maria; García-Sevilla, Pedro. "Image processing: Dealing with texture". 2006. ISBN: 978-0-470-02628-1.Mirmehdi, M.; Xie, X.; Suri, J. (Eds.). "Handbook of texture analysis". 2008. ISBN: 978-1-84816-115-3.Artigos recentes en revistas e conferencias científicas relevantes: IJCV, IEEE TPAMI, ICCV, CVPR, NIPS, ECCV, etc.
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Fundamentals of Machine Learning for Computer Vision /614535007 Fundamentals of Image Processing and Analysis /614535001
Subjects that continue the syllabus
Other comments
-Segundo se recolle nas distintas normativas de aplicación para a docencia universitaria incorporarase a perspectiva de xénero nesta materia-Traballarase para identificar e modificar prexuízos e actitudes sexistas e influirase na contorna para modificalos e fomentar valores de respecto e igualdade.-Deberanse detectar situacións de discriminación por razón de xénero e proporanse accións e medidas para corrixilas