UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					**2021/22**
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	
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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.				
Contingency plan	1. Modifications to the contents No change 2. Methodologies All activities are maintained. The teaching will be online and the lessons will take place synchronously in the official schedule of classes. It may be that, for reasons of inconvenience, some of the classes will be held asynchronously, which will be communicated to the students in advance. 3. Mechanisms for personalized attention to students The tutorials will be telematic and will require an appointment. 4. Modifications in the evaluation No change in the evaluation. Evaluation activities that cannot be carried out in person will be carried out telematically through the institutional tools in Office 365 and Moodle. In this case, a series of validation measures will be required, which will require the students to have a device with a microphone and a camera, while appropriate validation software is not available. An interview may be arranged with each student to comment on or explain part or all of the tests carried out. In these scenarios, some of the activities under each heading may be modified, adapting them to the situation, but not their overall contribution to the final grade (the weighting percentage) 5. Modifications to the bibliography or webgraphy No change				

Study programme competences	
Code	**Study programme competences**

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		
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	Ordinary class hours	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	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

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.