| Teaching Guide | | | | |
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| Identifying Data | | | | 2020/21 |
| 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<br><br>No change<br><br>2. Methodologies<br><br>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.<br><br>3. Mechanisms for personalized attention to students<br><br>The tutorials will be telematic and will require an appointment.<br><br>4. Modifications in the evaluation<br><br>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)<br><br>5. Modifications to the bibliography or webgraphy<br><br>No change | | | |

| Study programme competences | |
|---|---|
| Code | Study programme competences |
| A1 | CE1 - To know and apply the concepts, methodologies and technologies of image processing |

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| 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<br>BC2<br>BC6<br>BC8 | CC1<br>CC2 |
| Description of visual content through local characteristics of colour, shape and texture. | AC1 | BC1<br>BC2<br>BC6<br>BC8 | CC1<br>CC2 |
| To apply image modelling and representation techniques to image processing and analysis problems. | AC1 | BC1<br>BC2<br>BC6<br>BC8 | CC1<br>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 C2 C1 | 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<br>Laboratory practice<br>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 C2 C1 | 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 |
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| 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 |
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| **Subjects that it is recommended to have taken before** |

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| **Subjects that are recommended to be taken simultaneously** |
| Fundamentals of Machine Learning for Computer Vision /614535007<br>Fundamentals of Image Processing and Analysis /614535001 |
| **Subjects that continue the syllabus** |
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| **Other comments** |
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**(*)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.**