| Teaching Guide | | | | |
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| Identifying Data | | | | 2022/23 |
| Subject (*) | Knowledge and Reasoning under Uncertainty | | Code | 614544007 |
| Study programme | Máster Universitario en Intelixencia Artificial | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Official Master's Degree | 2nd four-month period | First | Optional | 3 |
| Language | English | | | |
| Teaching method | Face-to-face | | | |
| Prerequisites | | | | |
| Department | Ciencias da Computación e Tecnoloxías da Información | | | |
| Coordinador | Moret Bonillo, Vicente | E-mail | vicente.moret@udc.es | |
| Lecturers | Cabalar Fernandez, Jose Pedro<br>Moret Bonillo, Vicente | E-mail | pedro.cabalar@udc.es<br>vicente.moret@udc.es | |
| Web | | | | |
| General description | | | | |

| Study programme competences / results | |
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| Code | Study programme competences / results |
| A6 | CE05 - Ability to design and develop intelligent systems through the application of inference algorithms, knowledge representation and automated planning |
| A7 | CE06 - Ability to recognise those problems that require a distributed architecture, not predetermined during the system design, suitable for the implementation of multiagent systems |
| A8 | CE07 - Ability to understand the consequences of the development of an explainable and interpretable intelligent system |
| A9 | CE08 - Ability to design and develop secure intelligent systems, in terms of integrity, confidentiality and robustness |
| B1 | CG01 - Maintaining and extending theoretical foundations to allow the introduction and exploitation of new and advanced technologies in the field of AI |
| B2 | CG02 - Successfully addressing each and every stage of an AI project |
| B3 | CG03 - Searching and selecting that useful information required to solve complex problems, with a confident handling of bibliographical sources in the field |
| B6 | CB01 - Acquiring and understanding knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, frequently in a research context |
| B7 | CB02 - The students will be able to apply the acquired knowledge and to use their capacity of solving problems in new or poorly explored environments inside wider (or multidisciplinary) contexts related to their field of study |
| B8 | CB03 - The students will be able to integrate different pieces of knowledge, to face the complexity of formulating opinions (from information that may be incomplete or limited) and to include considerations about social and ethical responsibilities linked to the application of their knowledge and opinions |
| B9 | CB04 - The students will be able to communicate their conclusions, their premises and their ultimate justifications, both to specialised and non-specialised audiences, using a clear style language, free from ambiguities |
| C2 | CT02 - Command in understanding and expression, both in oral and written forms, of a foreign language |
| C3 | CT03 - Use of the basic tools of Information and Communications Technology (ICT) required for the student's professional practice and learning along her life |
| C4 | CT04 - Acquiring a personal development for practicing a citizenship under observation of the democratic culture, the human rights and the gender perspective |
| C5 | CT05 - Understanding the importance of the entrepreneurial culture and knowledge of the resources within the entrepreneur person's means |
| C6 | CT06 - Acquiring abilities for life and healthy customs, routines and life styles |
| C7 | CT07 - Developing the ability to work in interdisciplinary or cross-disciplinary teams to provide proposal that contribute to a sustainable environmental, economic, political and social development |

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| C8 | CT08 - Appreciating the importance of research, innovation and technological development in the socioeconomic and cultural progress of society |

| Learning outcomes | | | |
|---|---|---|---|
| Learning outcomes | Study programme competences / results | | |
| knowing and understanding the concepts of imprecision and uncertainty versus certainty | AC5<br>AC6<br>AC7<br>AC8 | BC1<br>BC2<br>BC3<br>BC6<br>BC7<br>BC8<br>BC9 | CC2<br>CC3<br>CC6<br>CC7<br>CC8 |
| knowing the main models of imprecise reasoning and assessing their adequacy for problem solving in the scope of Artificial Intelligence | AC5<br>AC6<br>AC7<br>AC8 | BC1<br>BC2<br>BC7<br>BC8<br>BC9 | CC2<br>CC4<br>CC5<br>CC7<br>CC8 |

| Contents | |
|---|---|
| Topic | Sub-topic |
| Graphical Models | Graphical Models. Approximate and exact inference in graphical models |
| Bayesian Networks | Bayesian Networks |
| Decision Networks | Decision Networks |
| Computing with fuzzy words and models of reasoning | Computing with fuzzy words and models of reasoning |

| Planning | | | | |
|---|---|---|---|---|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student?s personal work hours | Total hours |
| Laboratory practice | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | 10.5 | 21 | 31.5 |
| Objective test | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | 1.5 | 10.5 | 12 |
| Guest lecture / keynote speech | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | 10.5 | 21 | 31.5 |
| 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 |
| Laboratory practice | Practical work, normally in groups, with tools of real time systems |
| Objective test | Individual exam |
| Guest lecture / keynote speech | Classes of concepts and foundations with small exercises |

| Personalized attention |
|---|

| Methodologies | Description |
|---|---|
| Guest lecture / keynote speech<br>Laboratory practice<br>Objective test | Tutorials and remote guidance by e-mail or online platform (Teams, moodle, etc) |

| Assessment | | | |
|---|---|---|---|
| Methodologies | Competencies / Results | Description | Qualification |
| Guest lecture / keynote speech | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | Depending on how the course evolves, a part of the exam could be consolidated by submitting solved exercises along the lecture classes period | 0.5 |
| Laboratory practice | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | Submission of one or several practical assignments | 49.5 |
| Objective test | A6 A7 A8 A9 B1 B2 B3 B6 B7 B8 B9 C2 C3 C4 C5 C6 C7 C8 | An individual exam consisting of several exercises that will be assessed up to a maximum of 50 points | 50 |

| Assessment comments |
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| Sources of information | |
|---|---|
| Basic | - Castillo, Gutiérrez, Hadi (2009). Sistemas Expertos y Modelos de Redes Probabilísticas. Monografías Academia Ingeniería<br>- Palma, Marín, eds. (2008). Inteligencia Artificial: Métodos, Técnicas y Aplicaciones. McGraw Hill |
| Complementary | |

| Recommendations |
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| Subjects that it is recommended to have taken before |
| Reasoning and Planning /614544003 |
| Subjects that are recommended to be taken simultaneously |
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| 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.