Teaching Guide					
Identifying Data					2022/23
Subject (*)	Real Time Intelligent Systems			Code	614544026
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					
Coordinador	Cabalar Fernandez, Jose Pedro		E-mail	pedro.cabalar@udc.es	
Lecturers	Cabalar Fernandez, Jose Pedro		E-mail	pedro.cabalar@udc.es	
Web					
General description					

Study programme competences / results	
Code	Study programme competences / results
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
A10	CE09 - Ability to obtain a deep knowledge about fundamental principles and models of quantum computing and to apply them for the interpretation, selection, evaluation, modelling and creation of new concepts, theories, uses and technological developments related to Artificial Intelligence
A14	CE13 - Knowledge of computer tools in the field of data analysis and statistical modelling and ability to select those ones most suitable for problem solving
A15	CE14 - Understanding and command of the main machine learning techniques, including those devised for big volumes of data. Understanding and command of basic concepts and techniques for information search and filtering in big collections of data.
A16	CE15 - Knowledge of computer tools in the field of machine learning and ability to select those ones most suitable for problem solving
A20	CE19 - Knowledge of the different environments where AI based technologies can be applied and awareness of their capability to provide a differentiating added value
A21	CE20 - Ability to combine and adapt different techniques, extrapolating knowledge among different application domains
A22	CE21 - Knowledge of the techniques that facilitate the efficient organisation and management of AI projects in real environments, including resources management and tasks scheduling and taking into account the concepts of knowledge dissemination and open science
A23	CE22 - Knowledge of the techniques that facilitate the security of data, applications and communications and the derived consequences on different application domains in AI
A28	CE27 - Understanding the significance of the entrepreneurial culture and knowledge of the resources within the enterpreneur person's means
A29	CE28 - Appropriate knowledge of the concept of enterprise, its organisation and management, and of the different business sectors, with the goal of providing solutions from the AI perspective
A30	CE29 - Being able to apply knowledge, abilities and attitudes to the business and professional world, by planning, managing and evaluating projects in the scope of AI
A31	CE30 - Being able to set out, model and solve problems that require the application of AI methods, techniques and technologies
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
B5	CG05 - Working in teams, especially of multidisciplinary nature, and being skilled in the management of time, people and decision making
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

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
B10	CB05 - The students will acquire learning abilities to allow them to continue studying in way that will mostly be self-directed or autonomous
C2	CT02 - Command in understanding and expression, both in oral and written forms, of a foreign language
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

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowing the features and functions of a real-time system	AC7 AC8 AC9 AC13 AC14 AC15 AC19 AC20 AC21 AC22	BC1 BC2 BC5 BC6 BC9 BC10	CC2 CC4 CC5 CC6
Ability to design and program a real-time system	AC7 AC8 AC9 AC13 AC14 AC15 AC19 AC22 AC27	BC7 BC9 BC10	CC2 CC4 CC5 CC6
Knowing the most common programming languages for real-time systems, both synchronous and asynchronous	AC7 AC8 AC9 AC13 AC14 AC15 AC19 AC20 AC21 AC22 AC27 AC28 AC29 AC30	BC1 BC2 BC5 BC6 BC7 BC9 BC10	CC2 CC4 CC5 CC6

Knowing how to develop trustable software components, with special emphasis on fail tolerance and error recovery	AC7 AC8 AC9 AC13 AC14 AC15 AC19 AC20 AC21 AC22 AC27 AC28 AC29 AC30	BC1 BC2 BC5 BC6 BC7 BC9 BC10	CC2 CC4 CC5 CC6

Contents	
Topic	**Sub-topic**
Real Time Systems	Real Time Systems
Determinism and trustability	Determinism and trustability
Paralelism	Paralelism
Synchronous and asynchronous hipotheses	Synchronous and asynchronous hipotheses
Implementation languages	Implementation languages
Simulation	Simulation
Behaviour verification	Behaviour verification
Planning strategies	Planning strategies
Architectures	Architectures

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Laboratory practice	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	10.5	21	31.5
Objective test	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	1.5	10.5	12
Guest lecture / keynote speech	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	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 Laboratory practice 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	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	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	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	Submission of one or several practical assignments	49.5
Objective test	A8 A9 A10 A14 A15 A16 A20 A21 A22 A23 A28 A29 A31 A30 B1 B2 B5 B6 B7 B9 B10 C2 C4 C5 C6	An individual exam consisting of several exercises that will be assessed up to a maximum of 50 points	50

Assessment comments

Sources of information	
Basic	
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Machine Learning I /614544012 Deep Learning /614544013 Machine Learning II /614544014 Knowledge and Reasoning under Uncertainty/614544007 Reasoning and Planning /614544003
Subjects that are recommended to be taken simultaneously
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.