

Teaching Guide						
Identifying Data 2022/23			2022/23			
Subject (*)	Multiagent Systems			Code	614544005	
Study programme	Máster Universitario en Intelixencia Artificial					
	Descriptors					
Cycle	Period	Ye	ar	Туре	Credits	
Official Master's Degre	e 2nd four-month period	Fi	rst	Optional	6	
Language	English					
Teaching method	Face-to-face					
Prerequisites						
Department	Ciencias da Computación e Tecnoloxías da Información					
Coordinador	Sanchez Maroño, Noelia E-mail noelia.sanchez@udc.es					
Lecturers	Alvarez Estevez, Diego		E-mail	diego.alvareze@udc.es		
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Web	campusvirtual.udc.gal					
General description	The main objective of this subject is to learn to distinguish the appropriate problems for designing multi-agent systems, as					
	well as their main characteristics. The concept of an intelligent agent is introduced. The main theories and models will be					
	detailed, as well as the various architectures of multi-agent systems and their most relevant applications.					

	Study programme competences / results
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
C8	CT08 - Appreciating the importance of research, innovation and technological development in the socioeconomic and cultural progress of
	society

Learning outcomes			
Learning outcomes	Study	y progra	amme
	con	npetenc	es/
		results	
Introduce the concept of multi-agent systems based on the need for distributed architectures in intelligent systems	AC6	BC1	CC3
	AC7	BC9	CC6
	AC8		CC8
Understand the different approaches to intelligent agent architectures	AC5	BC1	
	AC6	BC6	
		BC7	
Understand the notion of negotiation as a simple aspect inherent to multi-agent systems.	AC6	BC6	
	AC7	BC7	
Understand the notions and basic aspects of communication, coordination and cooperation.	AC6	BC8	
	AC7		
Analyze the various existing methodologies for the development of multi-agent systems.	AC5	BC2	CC2
	AC6	BC8	
Know applications of this type of systems in industrial, medical, computer environments, etc.	AC6	BC3	CC4
		BC6	CC5
		BC7	CC7

Contents		
Торіс	Sub-topic	
Introduction	Intelligent agent concept	
	Multiagent system	
Agent architectures	Deliberative architectures	
	Reactive architectures	
	Hybrid architectures	
Interaction between agents	Communication	
	Negotiation	
	Cooperation	
	Coordination	
Agent-oriented methodologies	Adaptation of existing methodologies	
	Agent-oriented methodologies	
Applications	Industry	
	Medicine	
	Computer science	

Planning				
Methodologies / tests	Competencies /	Teaching hours	Student?s personal	Total hours
	Results	(in-person & virtual)	work hours	
Laboratory practice	A6 A9 B2 C3 C6 C7	14	48	62
Problem solving	A7 B1 B3 B7 C4 C5	7	39	46
Oral presentation	B9 C2	1	1	2
Guest lecture / keynote speech	A8 B8 C8	21	17	38
Objective test	B6 B8 C2	2	0	2



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	The practical classes will consist of developing a basic multiagent system (MAS) or some specific parts of it. The delivery may
	have different deadlines to encourage continuous work. The practical instructions will be provided in advance for students to
	read in detail, and they must be strictly followed. Later, the work of the teachers will be to supervise the practical sessions,
	resolving doubts and correcting misinterpretations, errors, etc
Problem solving	In the problem classes, practical assumptions will be presented directly related to theoretical concepts. The students will have
	to look for alternative solutions outside the classroom. The aim is to encourage student participation and promote, as far as
	possible, open dialogue and the assessment of solutions.
Oral presentation	For some practical or problem, students must prepare a presentation where they expose their work in the classroom,
	highlighting the main contributions and conclusions.
Guest lecture /	Oral presentation supplemented with the use of audiovisual media and
keynote speech	introduction of some questions addressed to students for the purpose
	to transmit knowledge and facilitate learning.
Objective test	It will consist of theoretical-practical questions about any of the concepts included in the course agenda.

	Personalized attention
Methodologies	Description
Laboratory practice	The adequate progress of the students will determine the development of master classes, problem-solving classes, and
Problem solving	practical labs.
	Laboratory practicals will be carried out, primarily, as autonomous work. For its proper development, it will be necessary to
	monitor periodically the students' work to clarify errors and concepts as soon as possible and ensure the quality of work.
	Outside class hours, the official tutoring hours allow personalized attendance through the following channels:
	- E-mail: Use for short answer queries.
	- Teams: virtual meetings (upon request via e-mail)

Assessment			
Methodologies	Competencies /	Description	
	Results		
Objective test	B6 B8 C2	It will consist of theoretical and practical questions on any of the items included in the	40
		contents	
Laboratory practice	A6 A9 B2 C3 C6 C7	Realization of the tasks, in time and form, is established in the instructions of any	60
		proposed practical. To pass the subject is essential to have made and approved the	
		practicals. As part of it, issues such as school attendance, personal work, attitude, etc.	
		will help to pass the practicals.	
Oral presentation	B9 C2	It could be included in some problem solving/laboratory practice and it would affect the	0
		final grade of it, however it is not graded on its own.	

Assessment comments

Sources of information



Basic	- Gerhard Weiss (2013). Multiagent Systems, Second Edition. MIT Press
	- Adelinde M. Uhrmacher, Danny Weyns (2009). Multi-Agent Systems Simulation and Applications. Routledge, Taylor
	& Francis Group
	- Michael Wooldridge (2009). An introduction to multiagent systems. Wiley
Complementary	

Recommendations

Subjects that it is recommended to have taken before

AI Fundamentals/614544001

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.