

Teaching Guide					
Identifying Data			2022/23		
Subject (*)	Intelligent Robotics I		Code	614544019	
Study programme	Máster Universitario en Intelixencia	a Artificial			
		Descriptors			
Cycle	Period	Year	Туре	Credits	
Official Master's Degre	ee 1st four-month period	First	Obligatory	3	
Language	English				
Teaching method	Face-to-face				
Prerequisites					
Department	Ciencias da Computación e Tecno	loxías da Información			
Coordinador	Duro Fernández, Richard José	E-mail	richard.duro@uc	lc.es	
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Web					
General description	The main objective of this subject	is to provide the conceptual ba	ases of intelligent robotics	, that is, how AI techniques apply	
	to the particular case of robots with	n the aim of achieving autonor	mous operation. All the de	evelopment of the subject is based	
	on the distinctive properties of rob	otics, such as operation in rea	I environments and the ex	kistence of a physical body.	
	Based on these premises, the sub	ject covers fundamental aspe	cts of sensorization, action	n and control, with a practical	
approach towards the resolution of problems autonomously by the robot.					

	Study programme competences / results
Code	Study programme competences / results
A18	CE17 - Understanding and assimilation of the capacities and limitations of intelligent robotic systems, together with the technologies
	supporting them
A19	CE18 - Building up the ability to choose, design and implement AI based strategies to provide robotic systems, both individual and
	collective, with the capacities required to perform their tasks in a suitable way, according to the goals and constraints to be taken into
	account
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
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
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
C5	CT05 - Understanding the importance of the entrepreneurial culture and knowledge of the resources within the entrepreneur person's
	means
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 programme	
	con	npetenc	es/	
		results		
Know the different types of robots depending on their application. Know the principles of operation of the different types of	AC17	BC1	CC3	
sensors and actuators adapted to the different operating environments.		BC6		
Have an overview of the different possibilities and control objectives in traditional smart robots, as well as the basic	AC18	BC3	CC8	
technologies that can be applied.				
Know how to implement, even if it is in a simplified way, examples/elements of everything seen in theory (components of a	AC18	BC2	CC5	
cognitive architecture, learning methods).		BC7	CC7	
		BC9		

	Contents
Торіс	Sub-topic
Elements of an Intelligent Robotic System	
Real environments, embodiment and reality gap.	
Sensing and actuation.	
Knowledge based robotics	
Behavior based robotics	

Planning				
Methodologies / tests	Competencies /	Teaching hours	Student?s personal	Total hours
	Results	(in-person & virtual)	work hours	
Supervised projects	B1 B3 B9 C5 C8	2	20	22
Guest lecture / keynote speech	A18 A19 B6	10.5	10	20.5
Laboratory practice	B2 B7 C3 C7	10.5	21	31.5
Personalized attention		1	0	1

(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

	Methodologies
Methodologies	Description
Supervised projects	Practices in which some of the techniques seen in the theoretical classes on robot simulation environments and the robotic
	platforms selected by the teachers of the assignment will be implemented. These works will be carried out by the students
	autonomously and their progress will be tutored by the teachers.
Guest lecture /	Oral presentation by the teachers of the theoretical subject. This methodology can be hybridized with a collaborative learning
keynote speech	methodology.
Laboratory practice	Laboratory or remote sessions using ICTs in which the characteristics of the robotic platform selected for the assignment and
	its programming software will be explained. In addition, these classes will be used for students to program and test in the real
	robot the controllers they are doing for the supervised work.

Personalized attention		
Methodologies	Description	
Laboratory practice	aboratory practice A follow-up of the students will be carried out resolving doubts and discussing with them the evolution of the supervised work	
Supervised projects	and assigned practices.	

		Assessment	
Methodologies	Competencies /	Description	Qualification
	Results		
Laboratory practice	B2 B7 C3 C7	See below	50



Supervised projects	B1 B3 B9 C5 C8	See below	20
Guest lecture /	A18 A19 B6	See below	30
keynote speech			

Assessment comments The evaluation of the subject will consist of two distinct parts: theory (50%) and practical work (50%). The theoretical part will be evaluated through an examination that may consist of a work of analysis of scientific bibliography related to the subject of the subject, presented orally on the day of the final exam. The practical part will be evaluated from the average of the memoirs presented at the end of each practice. It will be necessary to approve the theory and practice part separately in order to approve the matter. Attendance to both theoretical and practical classes will be mandatory for the approval of the subject except in cases of justified absence. For those students who have a dispensation, the evaluation system will be the same although they will not have an obligation to attend theoretical classes. Second-chance assessment: Students must recover each suspended part (theory and practices). If one of the two parties has been approved during the first opportunity, the student may choose to save the corresponding note and only recover the suspended part. Students will be assessed as "unpresented" when they do not present the theory analysis work or any of the practice memoirs. The competences of the subject as well as the general-basic competences have specific contents in the subject that are introduced, as indicated, both in the exhibition and interactive classes. Subsequently, the students will develop these skills in the theoretical exam and with the realization of the practical work in which the cross-border competences will also work, especially with regard to the ability to use ICT tools (CT3), the understanding of entrepreneurial culture (CT5), the ability to work in a team (CT7) and the valorization of research and innovation (CT8). The specific competences will be evaluated both in the practical work that the student develops during the subject and in the theoretical exam. For cases of fraudulent performance of exercises or tests, the provisions of the "Regulation of evaluation of academic performance of students and review of qualifications" will apply.

Sources of information	
Basic	- Nikolaus Correll (2020). Introduction to Autonomous Robots. Magellan Scientific
	- Robin R. Murphy (2019). Introduction to AI Robotics. MIT Press
Complementary	

Recommendations		
Subjects that it is recommended to have taken before		
Subjects that are recommended to be taken simultaneously		
Machine Learning I /614544012		
Subjects that continue the syllabus		
Intelligent Robotics II/614544020		
Other comments		
To help achieve an immediate sustainable environment and meet the objective of action number 5: "Healthy and sustainable environmental and social		
research" of the "Green Campus Ferrol Action Plan" the delivery of the documentary works that are carried out in this field:		
It will be requested in virtual format and/or computer support		
It will be made through Moodle, in digital format without the need to print them.		
3. to be done on paper:		
Plastics will not be used.		
You will make good impressions on the face.		
Use recycled paper.		
Avoid the printing of drafts.		



(*)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.