Teaching Guide				
Identifying Data				2024/25
Subject (*)	Foundations of Artificial Intelligence		Code	614522003
Study programme	Mestrado Universitario en Bioinformática para Ciencias da Saúde			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Optional	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Morán Fernández, Laura	E-mail	laura.moranf@udc.es	
Lecturers	Morán Fernández, Laura	E-mail	laura.moranf@udc.es	
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General description	In this subject the student will be introduced to the basic concepts of artificial intelligence (AI), from the beginnings to the current techniques. It is intended that the student knows the fundamentals of AI and knowledge representation techniques.			

Study programme competences / results	
Code	Study programme competences / results
A2	CE2 ? To define, evaluate and select the architecture and the most suitable software for solving a problem in the field of bioinformatics
A3	CE3 ? To analyze, design, develop, implement, verify and document efficient software solutions based on an adequate knowledge of the theories, models and techniques in the field of Bioinformatics
A4	CE4 - Ability to acquire, obtain, formalize and represent human knowledge in a computable form for the resolution of problems through a computer system in any field of application, particularly those related to aspects of computing, perception and action in bioinformatics applications
A6	CE6 - Ability to identify software tools and most relevant bioinformatics data sources, and acquire skill in their use
B1	CB6 - Own and understand knowledge that can provide a base or opportunity to be original in the development and/or application of ideas, often in a context of research
B2	CB7 - Students should know how to apply the acquired knowledge and ability to problem solving in new environments or little known within broad (or multidisciplinary) contexts related to their field of study
B6	CG1 -Search for and select the useful information needed to solve complex problems, driving fluently bibliographical sources for the field
B7	CG2 - Maintain and extend well-founded theoretical approaches to enable the introduction and exploitation of new and advanced technologies
C1	CT1 - Express oneself correctly, both orally writing, in the official languages of the autonomous community
C6	CT6 - To assess critically the knowledge, technology and information available to solve the problems they face to.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowledge of the different approaches used by Artificial Intelligence.	AJ4	BJ1 BJ7	CJ6
To understand the basic concepts of each of them and their models.	AJ4	BJ1 BJ7	CJ6
To apply the acquired knowledge to the efficient implementation of intelligent approaches in the field of study of Bioinformatics and Biomedical Engineering.	AJ2 AJ3 AJ4 AJ6	BJ1 BJ2 BJ6 BJ7	CJ1 CJ6

Contents	
Topic	Sub-topic
1. Introduction	1.1 An historical perspective 1.2 Preliminary aspects 1.3 General considerations
2. Problem-solving	2.1 Introduction to solving problems in AI 2.2 The state space concept. Searching 2.3 General characteristics of searching processes 2.4 Pure search strategies: breadth-first and depth-first 2.5 Search strategies in state space
3. Structured knowledge representation	3.1 Introduction 3.2 Declarative methods 3.3 Procedural methods 3.4 Examples and a practical case 3.5 Production systems
4. Reasoning in AI	4.1 Basics of categorical reasoning 4.2 Basics of bayesian reasoning 4.3 Fuzzy sets
5. Fundamental methods of computational intelligence	5.1 Data-driven learning 5.2 Supervised classification methods 5.3 Unsupervised methods 5.4 Optimization methods 5.5 Evaluation

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Supervised projects	A2 A3 A4 A6 B2 B6 B7 C1 C6	12	36	48
Problem solving	A3 A4 B2 B6 B7 C1 C6	12	36	48
Guest lecture / keynote speech	A2 A3 A4 B7 B1 C6	14	28	42
Personalized attention		12	0	12
(*)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	Study and development of Artificial Intelligence applications in various aspects of the theoretical content of the course.
Problem solving	Use of Symbolic Artificial Intelligence techniques to solve problems.
Guest lecture / keynote speech	Teaching the contents of the course, promoting involvement of students.

Personalized attention	
Methodologies	Description

Problem solving Guest lecture / keynote speech Supervised projects	The development, both of the master classes and of the problem solving and practical laboratories, will be carried out according to the students' progress in the comprehension and assimilation of the contents taught. The general progress of the class will be combined with specific attention to those who present greater difficulties in the task of learning and with additional support to those who present greater fluency and wish to expand their knowledge. Personalized attention is provided through the following channels: - E-mail: For short-answer queries or to request meetings to solve doubts. - Teams: To be used during the official tutoring schedule in which an immediate response is guaranteed. - Virtual Campus: "Thematic forums" will be made available to students to solve general doubts related to specific activities such as internships.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Problem solving	A3 A4 B2 B6 B7 C1 C6	Delivery on time will be valued, as well as the attendance to the hours assigned for the internship.	30
Guest lecture / keynote speech	A2 A3 A4 B7 B1 C6	Written test to evaluate the knowledge about the course.	30
Supervised projects	A2 A3 A4 A6 B2 B6 B7 C1 C6	Delivery of work related to the different parts of the subject.	40

Assessment comments
It will be necessary to achieve a grade equal to or higher than 5 in the overall grade of the course to pass it, after adding the grade of the tutored work, the problem solving and the written exam. Evaluation in the second opportunityThe grade of the written exam ("Guest lecture") is NOT maintained between opportunities. The overall grade of "Supervised projects" as well as the "Problem Solving" block will be maintained for the second opportunity. Only the practicals graded with SUSPENSED or NOT SUBMITTED in the first opportunity can be submitted in the second opportunity, always according to the statement proposed for the link.Enrollment with academic waiverStudents enrolled with academic dispensation are exempted from attending classes, but must submit the evaluable activities under the specific conditions and deadlines that will be established during the course. It is the student's responsibility to inform the faculty of this circumstance.

Sources of information	
Basic	- Moret et al. (20015). Fundamentos de inteligencia artificial. Servicio de publicaciones de la UDC (2ª ed, 2ª imp) - José T. Palma, Roque Marín Morales et al. (2008). Inteligencia artificial - Técnicas, métodos y aplicaciones. McGraw Hill (1ª ed.) - Russell & Norvig (2004). Inteligencia artificial: un enfoque moderno. . Pearson (2ª ed)
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Introduction to programming/614522001
Subjects that continue the syllabus
Computational intelligence for high dimensional data/614522024 Computational intelligence for bioinformatics/614522012 High performance computing in bioinformatics/614522011
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.