



Teaching Guide

Teaching Guide				
Identifying Data				2024/25
Subject (*)	Computational intelligence for high dimensional data		Code	614522024
Study programme	Mestrado Universitario en Bioinformática para Ciencias da Saúde			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	Second	Obligatory	3
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Eiras Franco, Carlos	E-mail	carlos.eiras.franco@udc.es	
Lecturers	Eiras Franco, Carlos	E-mail	carlos.eiras.franco@udc.es	
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General description	We will work on the concepts and practical application of high-dimensional databases and on the application of data mining techniques in the bioinformatics.			

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
B3	CB8 - Students to be able to integrate knowledge and deal with the complexity of making judgements from information that could be incomplete or limited, including reflections on the social and ethical responsibilities linked to the application of their skills and judgments
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
C3	CT3 - Use the basic tools of the information technology and communications (ICT) necessary for the exercise of their profession and lifelong learning
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		
To know and understand the paradigms and most relevant aspects of high-dimensional database processing.	AJ2	BJ1	CJ1
	AJ3	BJ2	CJ3
	AJ4	BJ3	CJ6
	AJ6	BJ6	
		BJ7	



To know and learn how to apply the main data mining methods; to know the main platforms and paradigms used in the field.	AJ2	BJ1	CJ1
	AJ3	BJ2	CJ3
	AJ4	BJ3	CJ6
	AJ6	BJ6	
		BJ7	

Contents	
Topic	Sub-topic
Introducción ao Big data.	Qué é Big Data Principais características do Big data Principais campos de aplicación
Minería de datos e alta dimensión	Analítica Big data Técnicas de preprocesado MapReduce
Modelos de programación Batch	Hadoop Resilient Distributed datasets Programación batch en Spark
Modelos de programación streaming	Conceptos básicos Kafka, Apache Storm, Spark streaming

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student's personal work hours	Total hours
Guest lecture / keynote speech	A4 C1 C6	12	24	36
Supervised projects	A2 A3 A4 A6 B3 B6 C1 C3	8	24	32
Mixed objective/subjective test	B1 B2 B7	2	4	6
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
Guest lecture / keynote speech	Empregada durante as clases presenciais teóricas para expor o núcleo básico de coñecementos que logo os alumnos terán que saber utilizar e ampliar nas prácticas.
Supervised projects	Elaboración de traballos aplicados que empreguen as tecnoloxías e técnicas vistas na teoría.
Mixed objective/subjective test	Comprobarase por medio de cuestionarios a correcta asimilación dos conceptos aplicados na elaboración dos traballos tutelados.

Personalized attention	
Methodologies	Description



Supervised projects Guest lecture / keynote speech	As titorías considéranse unha parte importante dentro do desenvolvemento da asignatura. Están orientadas de tal maneira que os/as estudantes teñan e/ou poidan consultar distintas cuestións como: 1. Dúvidas respecto a conceptos explicados nas clases teóricas. 2. Problemas no desenvolvemento das prácticas 3. Maneiras de enfocar/organizar as prácticas 4. Resolución de dubidas sobre as cuestións teóricas A resolución de dúvidas e cuestións farase nas horas de clase ou nas horas establecidas como titorías de cada profesor.
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Assessment			
Methodologies	Competencies / Results	Description	Qualification
Mixed objective/subjective test	B1 B2 B7	Cada un dos traballos tutelados avaliarase cun cuestionario que se realizará inmediatamente despois de elaborar dito traballo e abranguerá tanto os aspectos prácticos como teóricos. Deste xeito, a avaliación farase de xeito continuo durante o cuatrimestre e non haberá exame final.	100

Assessment comments

Sources of information	
Basic	- Vladimir Bacovski. (2015). Introduction to Big Data An Overview of Fundamental Big Data Concepts, Tools, Techniques and Practices.. O'Reilly Media - Venkat Ankam (2016.). Big Data Analytics. Packt Publishing - Tom White (2015). Hadoop: The Definitive Guide. O'Reilly Media - Thilina Gunarathne (2015). Hadoop MapReduce v2 Cookbook. Packt Publishing - Holden Karau, Andy Konwinski, Patrick Wendell, Matei Zaharia (2015). Learning Spark. O'Reilly Media - Sean T. Allen, Matthew Jankowski, and Peter Pathirana (2015). Storm Applied. . O'Reilly Media
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Computational intelligence for bioinformatics/614522012
Advanced statistical methods in bioinformatics/614522009
High performance computing in bioinformatics/614522011
Introduction to programming/614522001
Foundations of Artificial Intelligence/614522003
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.