		Teaching Guide		
	Identifying I	Data		2024/25
Subject (*)	Fundamentals of bioinformatics		Code	614522008
Study programme	Mestrado Universitario en Bioinforma	ática para Ciencias da S	aúde	'
		Descriptors		
Cycle	Period	Year	Туре	Credits
Official Master's Degree	1st four-month period	First	Obligatory	6
Language	SpanishGalicianEnglish			
Teaching method	Hybrid			
Prerequisites				
Department	Ciencias da Computación e Tecnolo	xías da InformaciónCom	putaciónFisioterapia, Medio	cina e Ciencias Biomédicas
Coordinador	Munteanu , Cristian Robert	E-m	nail c.munteanu@u	ıdc.es
Lecturers	Munteanu , Cristian Robert	E-m	nail c.munteanu@u	ıdc.es
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Web	udconline.udc.gal	1	1	
General description	This course will provide concepts on	the basic principles of g	enome annotation, sequence	ce analysis, processing tools of
	molecular information, tools for drug	design and evaluation o	f toxicity, biological databas	ses, omics and epigenetics, the
	Human Genome, Exposome and Va	riome projects, and bioir	nformatics applications in cli	nical practice.

	Study programme competences / results
Code	Study programme competences / results
A1	CE1 - Ability to know the scope of Bioinformatics and its most important aspects
A6	CE6 - Ability to identify software tools and most relevant bioinformatics data sources, and acquire skill in their use
A7	CE7 - Ability to identify the applicability of the use of bioinformatics tools to clinical areas.
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
В3	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
B5	CB10 - Students should possess learning skills that allow them to continue studying in a way that will largely be self-directed or
	autonomous.
В6	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
B8	CG3 - Be able to work in a team, especially of interdisciplinary nature
C1	CT1 - Express oneself correctly, both orally writing, in the official languages of the autonomous community
C2	CT2 - Dominate the expression and understanding of oral and written form of a foreign language
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.
C8	CT8 - Rating the importance that has the research, innovation and technological development in the socio-economic and cultural progress
	of society

Learning outcomes	
Learning outcomes	Study programme
	competences /
	results

To identify the characteristics of the computer science applications in health sciences	AJ1	BJ1	
	AJ6	BJ2	
		BJ3	
To be able to develop a research project in the field of biomedical informatics according to ethical and security health data	AJ7	BJ5	CJ1
requirements		BJ6	CJ2
		BJ7	CJ3
		BJ8	CJ6
			CJ8
To know how to identify fields of application of information technologies and communications to improve the delivery of health	AJ7		CJ1
services to citizens			CJ2
			CJ3
			CJ6
			CJ8

	Contents
Topic	Sub-topic
Basic principles for Genome Annotation	
Sequence analysis	
Processing tools of molecular information	
Tools for drug design and evaluation of toxicity	
Biological databases	
Omics and epigenetics: genomics, proteomics,	
transcriptomics	
Projects: Human Genome, Variome, Exposome	
Bioinformatics applications in clinical practice	

	Plannin	g		
Methodologies / tests	Competencies /	Teaching hours	Student?s personal	Total hours
	Results	(in-person & virtual)	work hours	
ICT practicals	A1 A6 A7 B1 B2 B3	30	40	70
	B5 B6 B7 B8 C1 C2			
	C3 C6 C8			
Oral presentation	A1 C1 C2 C3 C6 C8	5	20	25
Guest lecture / keynote speech	A1 A6 A7 B1 B2 B3	20	20	40
	B5 B6 B7 B8 C1 C2			
	C3 C6 C8			
Personalized attention		15	0	15

Methodologies

Methodologies

Description

ICT practicals

Laboratory practice can be face-to-face or through computer platforms such as TEAMS.

Oral presentation

Public presentation of the supervised work can be face-to-face or through computer platforms such as TEAMS.

Guest lecture /	In the theory sessions, the teacher describes the objectives and contents of the subject, to give a particular view of the subject
keynote speech	to be dealt with and to relate it to others within the subject.
	Then the corresponding topic is developed in the form of a lecture session, using the technical tools available, emphasizing certain issues in which the student must deepen his self-learning.
	The master sessions can be face-to-face or through computer platforms such as TEAMS. It is also possible to include explanatory videos of different parts of the theoretical contents.

	Personalized attention
Methodologies	Description
Oral presentation	To solve the most complex aspects of the course, individual or group tutorials with students will be held.
Guest lecture /	
keynote speech	
ICT practicals	

		Assessment	
Methodologies	Competencies /	Description	
	Results		
Oral presentation	A1 C1 C2 C3 C6 C8	The public exposition of the tutored work will be part of the final evaluation of the	75
		subject (45%). The quality of the work developed during class hours will be taken into	
		account (30%).	
ICT practicals	A1 A6 A7 B1 B2 B3	The quality and delivery in time of the practices will be assessed.	25
	B5 B6 B7 B8 C1 C2		
	C3 C6 C8		

Assessment comments

To pass this course, the student needs to obtain a minimum percentage in each of the methodologies.

Plagiarism:

In any submission in which plagiarism is detected, the submission will be assessed a zero. Plagiarism in the objective test will be penalized in accordance with current university regulations.

The second opportunity exam is the same as the first opportunity exam (presentation of a project).

Part-time students may request from the deans/directors of the centers responsible for their degree program, or the coordinators of the master's programs, as the case may be, the academic exemption that exempts them from attending classes in those subjects, or parts of subjects, where such exemption is admitted in their course guide; however, in any case, they will be evaluated by the continuous assessment system.

Sources of information

Basic	- Stekel, Dov. (2003). Microarray bioinformatics. Cambridge: Cambridge University Press, 2003
	- Ohlebusch, Enno (2013). Bioinformatics algorithms : sequence analysis, genome rearrangements, and phylogenetic
	reconstruction. Ulm : Oldenbusch Verlag
	- Dan E. Krane, Michael L. Raymer (2003). Fundamental concepts of bioinformatics. San Francisco, California :
	Benjamin Cummings
	- Edward Keedwell and Ajit Narayanan (2005). Intelligent bioinformatics the application of artificial intelligence
	techniques to bioinformatics problems. Chichester : John Wiley & Dons
	Graph-based Processing of Macromolecular Information, Current Bioinformatics 10(5): 606-631 (2016), DOI:
	10.2174/1574893610666151008012438 Cristian R. Munteanu, Vanessa Aguiar-Pulido, Ana Freire, Marcos
	Martínez-Romero, Ana B. Porto-Pazos, Javier Pereira, Julian Dorado onlineRRegrs: An R package for
	Computer-aided Model Selection with Multiple Regression Models, Journal of Cheminformatics 7(1), 1-16,
	doi:10.1186/s13321-015-0094-2 (2015) Georgia Tsiliki, Cristian R. Munteanu, Jose A Seoane, Carlos
	Fernandez-Lozano, Haralambos Sarimveis, Egon L. Willighagen GitHub 10.5281/zenodo.21946 online Bio-AIMS
	Collection of Chemoinformatics Web Tools based on Molecular Graph Information and Artificial Intelligence Models,
	Combinatorial Chemistry & Combinatorial Chem
	González-Díaz, Rafael García, Mabel Loza, Alejandro Pazos online S2SNet: A Tool for Transforming Characters and
	Numeric Sequences into Star Network Topological Indices in Chemoinformatics, Bioinformatics, Biomedical, and
	Social-Legal sciences, Current Bioinformatics 8(4), 429-437 (2013) Cristian R. Munteanu, Alexandre L Magalhães,
	Aliuska Duardo Sánchez, Alejandro Pazos, Humberto González-Díaz onlineTutorial Biopython:
	http://biopython.org/DIST/docs/tutorial/Tutorial.html
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
Materia impartida en inglés

(*)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.