Teaching Guide				
Identifying Data				2019/20
Subject (*)	Fundamentals of bioinformatics		Code	614522008
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	Obligatory	6
Language	English			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias Biomédicas, Medicina e FisioterapiaCiencias da Computación e Tecnoloxías da InformaciónComputación			
Coordinador	Munteanu , Cristian Robert	E-mail	c.munteanu@udc.es	
Lecturers	Fernández Lozano, Carlos Munteanu , Cristian Robert	E-mail	carlos.fernandez@udc.es c.munteanu@udc.es	
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General description	This course will provide concepts on the basic principles of genome annotation, sequence analysis, processing tools of molecular information, tools for drug design and evaluation of toxicity, biological databases, omics and epigenetics, the Human Genome, Exposome and Variome projects, and bioinformatics applications in clinical 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
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
B5	CB10 - Students should possess learning skills that allow them to continue studying in a way that will largely be self-directed or autonomous.
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
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 AJ6	BJ1 BJ2 BJ3	
To be able to develop a research project in the field of biomedical informatics according to ethical and security health data requirements	AJ7	BJ5 BJ6 BJ7 BJ8	CJ1 CJ2 CJ3 CJ6 CJ8
To know how to identify fields of application of information technologies and communications to improve the delivery of health services to citizens	AJ7		CJ1 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	.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
ICT practicals	A1 A6 A7 B1 B2 B3 B5 B6 B7 B8 C1 C2 C3 C6 C8	30	30	60
Oral presentation	A1 C1 C2 C3 C6 C8	5	5	10
Supervised projects	A1 C1 C2 C3 C6 C8	10	10	20
Objective test	A1 A6 A7 B1 B2 B3 B5 B6 B7 B8 C1 C2 C3 C6 C8	1	14	15
Guest lecture / keynote speech	A1 A6 A7 B1 B2 B3 B5 B6 B7 B8 C1 C2 C3 C6 C8	20	20	40
Personalized attention		5	0	5
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	**Description**
ICT practicals	Laboratory practice
Oral presentation	Public presentation of the supervised work
Supervised projects	Practical work on the theoretical content of the course
Objective test	Exam on the theoretical content and supervised work carried out throughout the course. This test could be replaced by the supervised work.

Guest lecture / keynote speech	Theoretical lessons in the classroom

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

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Supervised projects	A1 C1 C2 C3 C6 C8	The proposed work on the subject will be part of the evaluation.	30
Objective test	A1 A6 A7 B1 B2 B3 B5 B6 B7 B8 C1 C2 C3 C6 C8	If deemed necessary, a test on the theoretical and practical content of the course (including the topics of the lectures and publicly exposed supervised projects) may be conducted. The teacher can distribute points of this test among other methods if deemed appropriate.	30
Oral presentation	A1 C1 C2 C3 C6 C8	The public presentation of the supervised work will be part of the final assessment.	30
ICT practicals	A1 A6 A7 B1 B2 B3 B5 B6 B7 B8 C1 C2 C3 C6 C8	The quality and delivery in time of the practices will be assessed.	10

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

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 & Sons
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.