

SUBJECT TEACHING GUIDE

M1979 - BIOMEDICINE

University Master's Degree in Data Science

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	University Master's Degree in Data Science			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline	DATA LABORATORIES				
Course unit title and code	M1979 - BIOMEDICINE				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR
Name of lecturer	IGNACIO VARELA EGOICHEAGA
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Other lecturers	DAVID RODRIGUEZ GONZALEZ RAUL FERNANDEZ LOPEZ IGNACIO HEREDIA CACHA LARA LLORET IGLESIAS IKER IRISARRI AEDO RAFAEL ZARDOYA SAN SEBASTIAN VICTOR SANCHEZ GAYA JUAN ESTEBAN URIBE ARBOLEDA

3.1 LEARNING OUTCOMES

- To learn the principal databases, repositories, software or tools used in the analysis of biomedical data.
- To learn how to model the principal problems of each knowledge area and to identify on those critical points necessary to have to take into account to obtain the desired results.

4. OBJECTIVES

- To get familiar with the different available biological databases .
- To learn the principal data analysis strategies in three different biomedicine specialties .
- To get familiar with the common problems found in data analysis in biomedicine .

6. COURSE ORGANIZATION

CONTENTS

1	Analysis of medical imaging data. Data formats. Image analysis strategies. Clinical interpretation of the results.
2	Phylogenomics. Evolution and comparative biology. Next-generation sequencing technologies. Data retrieval from principal genetic databases. Genomics and transcriptomics. Phylogenetic data. Homology, Orthology and Paralogy. Multiple alignments.
3	Genomic and transcriptomic studies in human pathologies. Sequence alignment. Alteration identification. Clustering and multivariate analysis.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Class following and assesments	Work	No	Yes	60,00
Written Test	Written exam	No	No	40,00
TOTAL				100,00
Observations				
This course has been designed initially to be attended both face-to-face or remotely. In case the sanitary situation recommends against face-to-face classes, both the classes and the evaluation will be celebrated remotely.				
Observations for part-time students				
The same to those students full time.				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Stratton, M. R., Campbell, P. J. & Futreal, P. A. The cancer genome. *Nature* 458, 719–724 (2009).
- Shendure, J. & Ji, H. Next-generation DNA sequencing. *Nat. Biotechnol.* 26, 1135–1145 (2008).
- Mamanova, L. et al. Target-enrichment strategies for next-generation sequencing. *Nat. Methods* 7, 111–118 (2010).
- Amarasinghe S.L., Su S., Dong X., Zappia L., Ritchie M.E., Gouil Q. 2020 Opportunities and challenges in long-read sequencing data analysis. *Genome Biology* 21(1), 30. (doi:10.1186/s13059-020-1935-5).
- Conesa A., Madrigal P., Tarazona S., Gomez-Cabrero D., Cervera A., McPherson A., Szczesniak M.W., Gaffney D.J., Elo L.L., Zhang X., et al. 2016 A survey of best practices for RNA-seq data analysis. *Genome Biology* 17(1), 13. (doi:10.1186/s13059-016-0881-8).