SUBJECT TEACHING GUIDE

G1934 - Bioinformatics and Analysis of Omics Data

Degree in Biomedical Sciences

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Biomedical Sciences			Type and Year	Compulsory. Year 3
Faculty	Faculty of Medicine				
Discipline					
Course unit title and code	G1934 - Bioinformatics and Analysis of Omics Data				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. BIOLOGIA MOLECULAR
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3.1 LEARNING OUTCOMES
- To choose among the different genetic, epigenetic, metagenomic, transcriptomic and proteomic available technologies, the most appropriate one to obtained the desired biological information from your study.
- To identify the critical steps and limitations of each experimental approximation and to apply the needed quality controls in the data analysis to verify the scope and quality of the generated data in each omic study.
- To recognize systematic errors and biases in the generation of the data that could interfere with the bioinformatics analysis and to apply the appropriate tools to correct them.
- To choose and correctly use the appropriate bioinformatics tools for the analysis of each experiment as well as to correctly combine different tools to extract the desired information in each moment.
- To correctly interpret the obtained results being conscious of the limitations of each technology and the biological implication of each observation.

4. OBJECTIVES
To adquire tenough knowledge of the fundamentals of the currently used technologies to generate molecular big data as well as the principles of how to analyse this information to obtain significant molecular conclussions
To design and use omic technologies as well as to correctly interpret the obtained results.

6. COURSE ORGANIZATION	
CONTENTS	
1	Lesson 1: Introduction to the use of bioinformatics tools.
2	Lesson 2: Management of biological data.
3	Lesson 3: Analysis of biological information with R.
4	Lesson 4: Advanced analysis with R
5	Lesson 5: Graphical representation of biological data.
6	Lesson 6: Technologies of generation of molecular big data.
7	Lesson 7: Identification of genomic alterations.
8	Lesson 8: Identification of epigenomic alterations.
9	Lesson 9: Characterization of complex communities. Metagenomics.
10	Lesson 10: Identification of transcriptomic alterations.
11	Lesson 11: Identification of proteomic alterations.
12	Group practical lessons.
13	Individual project.
14	Final exam.
15	Tutorships

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Continuous assessment tests.	Activity evaluation with Virtual Media	No	No	15,00
Computer individual practical lessons.	Activity evaluation with Virtual Media	No	No	5,00
Group practical lessons.	Activity evaluation with Virtual Media	No	No	5,00
Individual Project	Work	No	Yes	15,00
Final exam.	Activity evaluation with Virtual Media	Yes	Yes	60,00
TOTAL				100,00

Observations

The students must obtain at least 3.5 points in the final examen in order to pass the subject.

Observations for part-time students

Those students that take the subject in partial-time modality should attend the group practical lessons that will be considered as 5% of the final mark. Additionally, they should present the individual project with a score that will take 15% of the final evaluation as well as the final exam that in their case will score 80% of the final mark.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

T. Strachan, J. Goodship y P. Chinney (2014). Genetics and Genomics in Medicine. London: Garlan Science.

B. Alberts, A. Johnson, J. Lewis, D. Morgan, M. Raff, K. Roberts y P. Walter (2015). The Molecular Biology of the Cell. London. Garlan Science.

Hawkins, R. David, Hon Gary C, Ren Bing. Next-generation genomics: an integrative approach. Nat. Rev. Genet, (2010). 11:476-486.