UAB
Universitat Autònoma de Barcelona

2018/2019

Microbial Genomics

Code: 101949
ECTS Credits: 6

Degree	Type	Year	Semester
2500890 Genetics	OT	4	0

Contact

Name: Susana Campoy Sánchez

Email: Susana.Campoy@uab.cat

Use of languages

Principal working language: catalan (cat)

Some groups entirely in English: No

Some groups entirely in Catalan: Yes

Some groups entirely in Spanish: No

Teachers

Jesús Aranda Rodríguez

Prerequisites

It is recommended to have coursed or are coursing Molecular Biology of Prokaryotes, Bioinformatics and Genetic Engineering of Microorganisms.

Objectives and Contextualisation

The main objective of this course is to broaden the vision of microbial genomics and the molecular and bioinformatics techniques used as well as their current and future applications.

Skills

- Apply knowledge of theory to practice.
- Apply scientific method to problem solving.
- Be able to analyse and synthesise.
- Be able to communicate effectively, orally and in writing.
- Describe and identify the structural and functional characteristics of nucleic acids and proteins including their different organisational levels.
- Design experiments and interpret the results.
- Develop self-directed learning.
- Know and apply the omic tools of genomics, transcriptomics and proteomics.
- Perceive the strategic, industrial and economic importance of genetics and genomics to life sciences, health and society.
- Reason critically.
- Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.

Learning outcomes

1. Apply knowledge of theory to practice.
2. Apply scientific method to problem solving.
3. Be able to analyse and synthesise.
4. Be able to communicate effectively, orally and in writing.
5. Defend the relevance of progress in the generation and interpretation of data on a genomic scale for our understanding and technological manipulation of organisms.
6. Describe and apply the methods for the analysis of proteomes, of genomics and of functional proteomics.
7. Design experiments and interpret the results.
8. Develop self-directed learning.
9. Explain and apply the methods for the analysis and annotation of genomes.
10. Reason critically.
11. Use and manage bibliographic information or computer or Internet resources in the field of study, in ones own languages and in English.
12. Use the techniques, tools and methodologies used to describe, analyse and interpret the enormous amounts of data produced by high performance technologies.

Content

The student will work on the following contents:
• Methods for the study of genomics
• Concept of species
• Genome and pangenome
• Genomic analysis
• From genome to function
• Comparative genomics
• Metagenomics
• Other omics
• Study of cases

Methodology

This course will be taught following the problem-based learning method (PBL). The class group will be divided into small groups that will independently work three problems. Each of the problems will last approximately 15 sessions, including the evaluation tests.
The student's role will be to actively participate in the working group, to assign group moderator roles, spokesperson and activities coordinator to the group members. They should also work individually to research, select and manage the information to share, discuss and re-elaborate the new knowledge with their work group. Finally, the group will discuss with the rest of the class the knowledge acquired, its application in the context of the problem and in other contexts.
The role of teachers will be to facilitate the learning process, stimulate group discussions and critical thinking, provide the necessary tools for students to build knowledge and guide them. If necessary, some participatory master classes can be performed.
At the beginning of the course, teachers will explain to the students the organization of the subject and will give the working guidelines.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Problem-based learning	40	1.6	2, 1, 5, 6, 8, 7, 9, 10, 4, 3, 11, 12
Type: Supervised			

Tutorship	3	0.12	5, 6, 9, 12
Type: Autonomous			
Integrate information and generate hypotheses	20	0.8	2, 10, 3, 11
Preparation of the work plan and oral presentations	20	0.8	2, 1, 6, 8, 7, 9, 10, 4, 3, 11
Reading specialized texts	40	1.6	11
Search and management of information	20	0.8	8, 10, 11

Evaluation

In order to pass the subject, it is mandatory to attend a minimum of 20 classroom sessions, including attendance at the working sessions of the class group, whose date of celebration will be established during the course development.
The evaluation of the subject consists of three modules associated with each of the three proposed problems.

The evaluation of each module will be made according to the following distribution:
1. **Individual written exam**: Consistent in a specific written test where the course-specific competencies worked on the problem is assessed. The maximum score is 2 points out of 10 for each problem.
2. **Deliveries and/or reports** associated with the problem. In all cases, a closing report will always be requested. The maximum mark for this section is 1 points out of 10 for each problem, distributed in the different deliveries. The number and specific weight of each delivery and/ or reports will be indicated in the problem presentation session.
3. **Self-evaluation of the group**: the working group should evaluate its functioning in solving the problem. The maximum mark is 0.5 points out of 10.
4. **Individual self-evaluation**: each member of the group should evaluate himself/herself and the rest of his/her classmates. The maximum mark is 0.5 points out of 10.

To pass each module the student must obtain at least a score of 4.5 points out of 10 in the individual written exam. If the student does not pass any of the individual written tests, he/she will perform a **retake examination**. To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two-thirds of the final score of the course or module.

The students pass the course when the average mark of the evaluation activities is equal to or greater than 5.

The student will be graded as "Non-evaluable" if the weight in of all conducted evaluation activities is less than 67% of t final score.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Case 1 individual written exam	20%	1	0.04	5, 6, 9, 10, 4, 12
Case 2 individual written exam	20%	1	0.04	5, 6, 9, 10, 4, 12
Case 3 individual written exam	20%	1	0.04	5, 6, 9, 10, 4, 12
Evaluation of deliveries and/or reports	30%	1	0.04	2, 1, 5, 6, 8, 7, 9, 10, 4, 3, 11
Individual self-evaluation	5%	2.25	0.09	2, 1, 5, 6, 8, 7, 9, 10, 4, 3, 11, 12
Work-group self-evaluation	5%	0.75	0.03	2, 1, 5, 6, 8, 7, 9, 10, 4, 3, 11, 12

Bibliography

It is the responsibility of the student to seek the bibliography necessary for the resolution of the problems raised. To do this he/ she can be advised by the teachers.