

Methods of Molecular Microbiology

Code: 42933
ECTS Credits: 6

Degree	Type	Year	Semester
4313775 Applied Microbiology	OB	0	1

Contact

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Teaching groups languages

You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Teachers

Maria Pilar Cortes Garmendia

Maria Perez Varela

Susana Campoy Sanchez

Prerequisites

It is recommended previous knowledge on Molecular Microbiology and Genetic Engineering of Microorganisms.

Objectives and Contextualisation

In this methodological module will be deepened in the knowledge of modern molecular Microbiology techniques, in order that the students acquire advanced knowledge that allows them to elaborate experimental procedures to study current topics of applied Microbiology.

Competences

- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Design and apply scientific methodology in problem solving.
- Develop critical reasoning within the subject area and in relation to the scientific or business context.

- Display knowledge of the most up-to-date methodology used in environmental, molecular, industrial and clinical microbiology.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use and manage bibliographic information and computer resources related to microbiology and related sciences.
- Use scientific terminology to account for research results and present these orally and in writing.

Learning Outcomes

1. Apply the most appropriate molecular methodologies for studying and resolving problems related to microbiological issues in health, environment and industry.
2. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
3. Continue the learning process, to a large extent autonomously.
4. Design and apply scientific methodology in problem solving.
5. Develop critical reasoning within the subject area and in relation to the scientific or business context.
6. Know and understand the bases for current techniques in molecular microbiology that are used in the various areas of applied microbiology.
7. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
8. Use and manage bibliographic information and computer resources related to microbiology and related sciences.
9. Use scientific terminology to account for research results and present these orally and in writing.

Content

The course will have the following contents:

- Current methods for the genetic modification of microorganisms.
- Molecular tools based on DNA for the classification of microorganisms and epidemiological studies.
- Application of the different omics (genomics, transcriptomics, etc.) to the resolution of microbiological problems.
- Use of metagenomics and metatranscriptomics techniques in the characterization of complex microbial samples and their possible applications.
- Elaboration of experimental protocols for the study of topics of current interest in the field of applied Microbiology.

Methodology

This module will be taught following the problem-based learning method (PBL). The class group will be divided into small groups that will work independently to solve the proposed project.

In the first classroom session, the teaching staff will present the module, its general characteristics and the working guidelines as well as the distribution of sessions. During the development of the work sessions, teachers will provide the necessary material and tools to guide students, and simultaneously stimulate discussion and critical knowledge among the working group members.

If it is considered necessary for the resolution of some aspect of the project, the teaching staff may give some participatory master classes to expand or deepen certain knowledge.

The members of the working groups must identify and assume the responsibilities and tasks necessary to solve the problem. They must also work individually to investigate, select and manage the information obtained to participate in the discussions with the rest of the group members in order to re-elaborate and expand their knowledge.

Finally, each group will discuss and discuss with the rest of the class the problem solving and its possible application in a more global context.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Project-based learning	30	1.2	1, 6, 5, 4, 7, 2, 3, 8, 9
Type: Supervised			
Experimental design of the proposed project	20	0.8	1, 6, 4, 7, 3
Preparation of oral presentation and defense of the work done	22	0.88	1, 6, 5, 2, 9
Type: Autonomous			
Information search and management	30	1.2	5, 8
Integrate information and formulate hypotheses	10	0.4	1, 6, 5, 4, 7, 3, 8
Preparation of work plans and oral presentations	20	0.8	1, 6, 5, 4, 7
Reading recommended texts	12.5	0.5	6, 8

Assessment

To pass the module is mandatory the attendance to the classroom sessions indicated by the teachers.

The evaluation will be made according to the following distribution:

1. Individual written exam: it will consist of a specific written test where the skills worked during the development of the project will be assessed. The weight of this part represents 40% of the final grade.
2. Delivery of report (s) and/or oral presentation (s): The number and specific weight of each delivery and/or oral presentation will be indicated in the presentation session of the project, in which the teachers will also establish the guidelines of each one. The weight of this part represents 50% of the final grade.
3. Participation and involvement of the student in the resolution of the project: the weight of this part represents 10% of the final grade.

The final grade of the module will be the weighted average of each of the evaluation typologies indicated.

Likewise, to pass the module it is needed to obtain a score equal to or greater than 5 points over the 10 points in the individual written exam. Otherwise, the student must perform and pass a second chance evaluation on the scheduled date.

To pass the module the final grade must be equal to or greater than 5.

Students that pass the exam but would like to improve the written exam score, they can perform a qualification improvement test that will be done the same day of the second chance evaluation, renouncing the previously obtained grade in this section. Students wishing to take the test must contact by mail with teaching staff at least 72 hours before the scheduled day.

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. Thus, the student will be graded as "No Valuable" if the weight in of all conducted evaluation activities is less than 67% of the final score.

Single assessment

The evaluation of the theoretical module consists of a single test that will be the same as that of the type of continuous assessment, but the grade obtained in this synthesis test will account for 50% of the final grade for the subject and the same system of evaluation will be applied for recovery than for continued evaluation.

The evaluation of the activities of the seminar module will mean 50% of the final grade for the subject. The students who take advantage of the single evaluation may deliver all the evidence together (including the oral presentation) on the same day as the one set for the synthesis test. The single assessment test will be carried out coinciding with the same date set in the calendar for the last continuous assessment test.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Delivery of reports and/or oral presentation/s	50%	1.5	0.06	1, 6, 4, 7, 2, 8, 9
Individual written exam	40%	3	0.12	1, 6, 5, 4, 7, 2, 9
Participation	10%	1	0.04	5, 3

Bibliography

Students can access the following open access texts as a reference bibliography of basic concepts:

Larry Snyder, Joseph E. Peters, Tina M. Henkin, Wendy Champness. Molecular Genetics of Bacteria (4th Edition). ASM press (ISBN:978-1-55581-627-8).

Versió digital disponible en el repositori de les biblioteques de la UAB:

<http://resolver.ebscohost.com/are.uab.cat/openurl?sid=EBSCO:nlebk&genre=book&issn=&ISBN=978155581627>

Jeremy W. Dale i Simon F. Park. Molecular Genetics of Bacteria, (5th Edition) Wiley- Blackwell (ISBN: 978-0-470-74184-9).

It will be the student's responsibility to search and consult the bibliography necessary for the resolution of problems. For this task, they will be advised by the faculty of the module.

Other recommended texts as well as links of interest will be available to the student in the Moodle classroom of the subject.

Software

The usual Microsoft environment programs will be used. It is possible to use some more specific free access software that the student will look for according to his needs to solve problems.