Contact

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Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: Yes

Prerequisites

Although there is no official prerequisites, students are advised and encouraged to review the scientific-theoretical contents related to the concepts of the microbial world, studied beforehand and on which this subject is based.

It is convenient to have a good knowledge of the subjects already studied during the first semester of the first course of the Biochemistry degree, as well as of the subjects simultaneous studied during the second semester of the course.

Objectives and Contextualisation

Microbiology is a compulsory course/subject of the Biochemistry degree, which introduces students to the microbial world, giving a general view of the microorganisms, in connection with other organisms, and with the different environments in which microorganisms live.

This subject gives basic concepts and skills in Microbiology, so that the students can dig deeper in the following courses that form part of the nucleus of the Biochemistry degree.

Detailed objectives of the course

1 Recognize the huge microbial biodiversity and know how to distinguish the characteristics that define different microbial groups.

2 Identify the different structures, as well as the composition, of the prokaryotic cell.

3 To know the metabolic versatility of the different microbial groups, particularly that of the prokaryote.

4 To know the genomic variability of microorganisms and the main mechanisms for genetic information exchange in prokaryotic cells.

5 Recognize the main relationships of microorganisms with the other organisms and with the physical environment they inhabit.

6 To know the role of microorganisms in the development of human societies, as well as their current and future applications.
7 Know how to perform basic calculations to determine microbiological parameters.

8 Understand basic laboratory techniques to work with microorganisms.

**Competences**

- Apply general laboratory security and operational standards and specific regulations for the manipulation of different biological systems.
- Be able to self-evaluate.
- Collaborate with other work colleagues.
- Describe the structural, physiological and biochemical characteristics of the different types of cells and explain how their properties fit in with their biological function.
- Integrate knowledge of biochemistry and molecular biology with that of microbiology and biochemical engineering, especially in their application to biotechnological processes.
- Integrate scientific and technological knowledge.
- Interpret experimental results and identify consistent and inconsistent elements.
- Manage bibliographies and interpret the information in the main biological databases, and also know how to use basic ICT tools.
- Manage information and the organisation and planning of work.
- Read specialised texts both in English and one's own language.
- Stay abreast of new knowledge of the structure, organisation, expression, regulation and evolution of genes in living beings.
- Take responsibility for one's own learning after receiving general instructions.
- Think in an integrated manner and approach problems from different perspectives.
- Use ICT for communication, information searching, data processing and calculations.

**Learning Outcomes**

1. Be able to self-evaluate.
2. Collaborate with other work colleagues.
3. Define rules for the safe handling of microorganisms.
4. Describe the molecular, cellular and physiological bases of the organisation, functioning and integration of microorganisms.
5. Describe the principal techniques for using microorganisms and their structures and molecules in biotechnological processes.
6. Identify the genetic properties of microorganisms.
7. Identify the genetic, physiological and metabolic properties of microorganisms that can potentially be used in biotechnological processes.
8. Identify the physiological and metabolic characteristics of microorganisms.
9. Interpret experimental results and identify consistent and inconsistent elements.
10. Manage information and the organisation and planning of work.
11. Master the nomenclature of microorganisms.
12. Read specialised texts both in English and one's own language.
13. Take responsibility for one's own learning after receiving general instructions.
14. Think in an integrated manner and approach problems from different perspectives.
15. Use ICT for communication, information searching, data processing and calculations.

**Content**

I Theoretical topics

INTRODUCTION

Topic 1. The world of microorganisms.

STRUCTURE AND FUNCTION OF THE PROKARYOTES


MICROBIAL GROWTH AND ITS CONTROL


PHYSIOLOGY AND BACTERIAL METABOLISM


BACTERIAL GENETICS


MICROBIAL DIVERSITY


THE VIRUSES

EPIDEMIOLOGY AND MICROBIAL DISEASES


APPLIED MICROBIOLOGY


II- Seminars and problems.


Topic 3. Techniques of sterilization of microorganisms. Basic principles and different sterilization techniques.


Methodology

The subject of Microbiology consists of two modules, which have been programmed in an integrated way so that the student will have to relate, throughout the whole course, the contents and the activities programmed for the course, and to achieve the skills indicated in section 5 of this guide.

The modules are as follows:

Theory classes: The student has to acquire the scientific-technical knowledge of this subject attending these classes and complementing them with personal study of the subjects.
At the beginning of the course, the student will be given a detailed calendar of the subjects to be dealt with throughout the course, as well as the bibliography that must be consulted to prepare each theoretical class and for personal study. Each topic will be based on a theoretical exposition and a short discussion of the material.

Problems and seminars: These classes are clearly active and participative sessions, with the goal of: a) working on methodological aspects, b) enabling the student to design basic experiments of Microbiology and proposing experimental protocols, c) designing strategies to solve and interpret problems, d) to acquire the necessary skills to carry out bibliographic research, reading texts and public presentations, e) to facilitate the understanding of the knowledge exposed to the theoretical classes and f) to bridge the gap between the theoretical classes and practical laboratory work. The student will come up with proposals for problems and/or scientific cases that need to be analyzed and developed during the course both individually and in group. It is possible to program some oral and/or written presentation/exhibition.

**Activities**

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<tr>
<th>Title</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning Outcomes</th>
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<td><strong>Type: Directed</strong></td>
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<tr>
<td>Problems in class</td>
<td>15</td>
<td>0.6</td>
<td>15, 2, 3, 5, 10, 9, 12, 14, 13, 1</td>
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<tr>
<td>Theoretical classes</td>
<td>30</td>
<td>1.2</td>
<td>3, 4, 5, 11, 10, 8, 6, 7, 14</td>
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<tr>
<td><strong>Type: Supervised</strong></td>
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<tr>
<td>Tutorial classes (individual or in groups)</td>
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<td>0.16</td>
<td>15, 2, 10, 12, 14, 13</td>
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<tr>
<td><strong>Type: Autonomous</strong></td>
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<td>Individual study</td>
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<td>2.4</td>
<td>15, 4, 5, 11, 10, 8, 6, 7, 12, 14, 13</td>
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<tr>
<td>Problems resolution</td>
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<tr>
<td>Text reading</td>
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<td>0.6</td>
<td>15, 2, 10, 9, 12, 14, 13, 1</td>
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**Assessment**

The assessment of the subject will be individual and continuous through the following tests:

Theoretical classes (70% of the overall grade).

During the course two partial written tests will be programmed. Each partial test will have a weight of 35% of the final grade of the course. The final note of this module will be the mean of the two proves. The student must achieve a minimum qualification of 5 in each test.

Those students who do not pass one or both of the written partial tests, or those students who wants to improve their grade, will have to attend to a final exam. The qualification obtained in this final exam will be used for the calculation of the final grade of this module.

Problem and seminar classes (30% of the overall grade).

The evaluation of this activity will be done separately:
- Resolution of problems and questions related to seminars held in class, by means of a written test at the end of the course. Students who do not pass this seminar/problem assessment test may do so by attending a remedial test in the data programmed. This part will correspond to 20% of the overall grade. The student must achieve a minimum qualification of 5 in this test.

- Oral presentations of the group work. Oral presentations will be evaluated with respect to the contents and organization of the presentation. This part will correspond to 10% of the overall grade. This activity will not have remedial test.

To exceed the whole course, student must achieve a qualification of 5 or higher in EVERY module. To participate in the remedial tests, the student must have been previously assessed in a set of activities, the weight of which is equivalent to a minimum of two third parts of the total qualification of the course. If not, the student will obtain the qualification of "Not Appraisable"

<table>
<thead>
<tr>
<th>Assessment Activities</th>
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<tbody>
<tr>
<td><strong>Title</strong></td>
</tr>
<tr>
<td>Evaluation of problems and seminars: Written exam (multiple choice and problems)</td>
</tr>
<tr>
<td>Evaluation of seminar and problems. Oral exposition</td>
</tr>
<tr>
<td>Evaluation of theoretical classes (questions multiple choice and shorts): 2 exams, 35% of final grade each.</td>
</tr>
</tbody>
</table>

**Bibliography**

Recomended bibliography


Other readings

De Kruif, P. 1926. Los cazadores de microbios. Ediciones Nueva Fénix

Blogs recomended

Esos pequeños bichitos

[http://weblogs.madrimasd.org/microbiologia/](http://weblogs.madrimasd.org/microbiologia/)
Blog *Small things considered*

http://schaechter.asmblog.org/schaechter/

Webs recommended

http://www.microbeworld.org/
http://microbewiki.kenyon.edu/index.php/MicrobeWiki
http://serc.carleton.edu/microbelife/
http://web.mst.edu/~microbio/Bio221.html
http://curiosidadesdelamicrobiologia.blogspot.com/
http://weblogs.madrimasd.org/microbiologia/
http://www.topix.com/science/microbiology
http://microbiologybytes.wordpress.com/
http://www.cellsalive.com/
http://commtechlab.msu.edu/sites/dlc-me/
http://commtechlab.msu.edu/sites/dlc-me/zoo/
http://www.microbiologia.com.ar/