Universidad Zaragoza

Academic Year/course: 2023/24

27109 - Microbiology

Syllabus Information

Academic year: 2023/24
Subject: 27109 - Microbiology
Faculty / School: 100 - Facultad de Ciencias
Degree: 446 - Degree in Biotechnology
ECTS: 9.0
Year: 2
Semester: Annual
Subject type: Compulsory
Module:

1. General information

This subject presents students with a basic approach to microorganisms, their characteristics, the most common working procedures and the most important aspects and processes in which microorganisms participate, from both the basic and the biotechnological point of view. It provides knowledge and skills necessary or complementary to understand and work in other related subjects.

This subject is aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (https://www.un.org/sustainabledevelopment/es/) Goal 3: Health and wellness; Goal 4: Quality Education; Goal 5: *Gender equality; Goal 6: Clean water and sanitation; Goal 7:* Affordable and non-polluting energy; Goal 9: *Industry, Innovation and infrastructure; Goal 13: Climate action; Goal 15: Life of terrestrial ecosystems.*

2. Learning results

Upon completion of the subject, the student will be able to:

- Distinguish the various groups of microorganisms (viruses, bacteria, fungi, algae, protozoa, etc.) and know their main types.
- Know the implication of microorganisms in the biotechnological, industrial, environmental, food, clinical, etc. fields,
- Perform basic manipulations of microorganisms in the laboratory, including fundamental tests for identification, isolation and culture tests, as well as operating the optical microscope, and monitoring microbial-based biotechnological processes at laboratory scale.
- Search and analyse specific information related to the subject.
- Prepare, defend and interpret reports related to the field of Microbiology.

3. Syllabus

Agenda:

1: History, concept and methods of Microbiology.

2: The microbial world

3: Characteristics of prokaryotic and eukaryotic microorganisms

4: Metabolism and microbial growth.

5: Control of microbial growth.

6: Antimicrobial agents

7: Microbial genetics and molecular biology. Metagenomics.

8: Microbiota, host interactions and microbial pathogenicity.

9: General characteristics of viruses.

10: Animal and plant viruses.

11: Bacteriophages and other subcellular infectious agents.

12: Gram-negative and Gram-positive bacteria

13: Archeas

14: Introduction eukaryotes. Fungi. Algae. Protozoa in the environment.

15: Parasitic protozoa.

16: Nematodes

17: Cestodes and trematodes

18: Arthropods

19: Clinical microbiology

20: Environmental microbiology

21: Food microbiology

22: Industrial microbiology

In addition, the syllabus of the subject is completed with seminars, problems, cases and laboratory practices.

4. Academic activities

The syllabus includes the following activities:

Training Activity 1: Acquisition of basic knowledge of the subject (5 ECTS).

Methodology: Participative master classes in large groups.

Training Activity 2: Laboratory practices (3 ECTS).

Methodology: Three periods of laboratory practices. Team and individual work.

Training Activity 3: Tutorial work (1 ECTS).

Methodology: Learning based on problems, seminars and case studies related to the subject. Oral presentation in class. Team and individual work.

Supporting material: Tutorials (individual or in small groups) and complementary material via web.

5. Assessment system

A midterm theoretical-practical test will take place in the middle of the term (first mid-term, in January). At the end of the term (first call) there will be a theoretical and practical exam to evaluate the rest of the subject (second midterm), and a new opportunity to sit for the first midterm exam. In the second call, the exams corresponding to both midterm exams will be carried out separately. It will be necessary to pass both mid-term exams in order to pass the subject. The assessment of the knowledge acquired through these tests will represent 65% of the final grade of the subject.

The evaluation of the laboratory practices will represent 15% of the final grade of the subject. It will consist of the resolution of written tests on the contents of the practices of blocks I (8.5%) and III (1.5%) and the presentation of a report of block II of practices (5%).

The evaluation of problems, seminars and assignments will account for 20% of the final grade of the subject. It is broken down as follows : written test on problem solving (6%), presentation and defence of seminars (4%), group work (10%).

In those assignments that involve the presentation of a written report and an oral presentation, 30% of the grade will correspond to the written work and the remaining 70% to the oral presentation.

Fraud or total or partial plagiarism in any of the evaluation tests will result in the failure of the subject with the minimum grade, in addition to the disciplinary sanctions adopted by the Guarantee Commission for these cases.