

## 27109 - Microbiology

### Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	9.0
Course	2
Period	Annual
Subject Type	Compulsory
Module	---

### 1. Basic info

#### 1.1. Recommendations to take this course

#### 1.2. Activities and key dates for the course

For students enrolled in the subject, places, times and dates of lectures and practical sessions will be public via Bulletin Board advertisements of the grade on the platform Moodle at the University of Zaragoza, <https://moodle2.unizar.es/add/>, and in the moodle page for the course. These routes will be also used to communicate enrolled students their distribution by groups of practical sessions, which will be organized by the coordination of degree. Provisional dates will be available on the website of the Faculty of Sciences in the corresponding section of the Degree in Biotechnology: <https://ciencias.unizar.es/grado-en-biotecnologia>.

In this web there will be also available the dates of exams.

### 2. Initiation

#### 2.1. Learning outcomes that define the subject

#### 2.2. Introduction

### 3. Context and competences

#### 3.1. Goals

#### 3.2. Context and meaning of the subject in the degree

#### 3.3. Competences

#### 3.4. Importance of learning outcomes

### 4. Evaluation

### 5. Activities and resources

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### 5.1. General methodological presentation

This course is based on the following learning-based activities:

**Activity 1:** Learning fundamentals of Microbiology (5 ECTS).

Methodology:

Participative lectures in a single group, and problem based sessions in two smaller groups. Both activities will take place in the days and times scheduled for the lectures. Supporting materials will be available from ADD (<https://moodle2.unizar.es/add/>), which will be updated every year. Individual follow-up will be available from all professors participating in this course.

**Activity 2:** Practical courses (laboratory) (3 ECTS).

Methodology:

Problem-based learning, and case-based learning. Supporting materials will be available from ADD (<https://moodle2.unizar.es/add/>), which will be updated every year. Practical courses will take place in small groups. Individual and team work.

**Activity 3:** Supervised work (seminars and practical cases) (1 ECTS).

Methodology:

Seminars, supervised practical work, and critical review of scientific literature. Supporting materials will be available from ADD (<https://moodle2.unizar.es/add/>), which will be updated every year. Oral presentations will be done in front of the group. Individual and team work.

### 5.2. Learning activities

The following activities have been planned in order to help students to achieve the objectives of this course:

#### 1) Lectures and problem-based sessions.

These two activities will be according to the following program:

Introduction to Microbial Biology

History, concept and methods in Microbiology. Basic characteristics of different groups of microorganisms, metabolism, microbial growth, antimicrobial agents, and genetics and microbial molecular genetics.

Microbial biodiversity

Gram positive and Gram negative bacteria, archaeobacteria, fungi, algae, viruses, parasites

Applied Microbiology

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Role of microbes in specific aspects: medicine, environment, food, industry, etc.

### 2) Practical courses

- Safety regulations and basic manipulations in a microbiology laboratory.
- Culture and identification of microorganisms by biochemical tests, microscope observations, staining, etc.
- Antimicrobial susceptibility testing
- Microbiology-based processes in food and industry
- Microbiological analysis of clinical, food and environmental samples.

All students will be informed of risks in the accomplishment of practical sessions in this subject, as well as if handling hazardous products and what to do in case of accident. All students must sign the commitment to comply with the rules of work and safety to perform practical sessions. For more information, consult the information for students in the risk prevention unit: <http://uprl.unizar.es/estudiantes.html> .

### 5.3.Program

#### LECTURES

#### PART I: INTRODUCTION TO BIOLOGY OF MICROORGANISMS

Lesson 1: History, methods and fundamentals of Microbiology

Lesson 2: A perspective of microbial world

Lesson 3: Characteristics of prokaryotic microorganisms

Lesson 4: Microbial growth and metabolism

Lesson 5: Microbial growth control

Lesson 6: Antimicrobial agents

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Lesson 7: Microbial genetics and molecular biology

Lesson 8: Host-pathogen interactions

### PART II: MICROBIAL DIVERSITY

Lesson 9: General characteristics of viruses

Lesson 10: Plant and animal viruses

Lesson 11: Bacteriophages and other subcellular infectious agents

Lesson 12: Gram-negative bacteria (proteobacteria)

Lesson 13: Gram-positive bacteria

Lesson 14: Other phyla of Bacteria. Archaeobacteria.

Lesson 15: Introduction to eukaryotic microorganisms: Fungi, algae

Lesson 16: Parasitology: nematodes

Lesson 17: Parasitology: cestodes and trematodes

Lesson 18: Parasitology: protozoa

### PART III: APPLIED MICROBIOLOGY

Lesson 19: Applied Parasitology

Lesson 20: Clinical Microbiology

Lesson 21: Water Microbiology

Lesson 22: Soil Microbiology

Lesson 23: Food Microbiology

Lesson 24: Metagenomics and microbiome

Lesson 25: Industrial Microbiology

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### SEMINARS

Seminar 1: Bactericidal activity of household cleaning products

Seminar 2: Microbial genetics

Seminar 3: Serology in diagnostics

Seminar 4: Diagnostics of viral infections

Seminar 5: Case studies in bacteriology

### PRACTICAL COURSES

Part 1: Basic Microbiology procedures

Part 2: Clinical Microbiology

Part 3: Parasitology

### 5.4.Planning and scheduling

Planning of activities, important dates

Schedules of lectures and problems will coincide with the officially established and will be available at:  
<https://ciencias.unizar.es/grado-en-biotecnologia>.

The places, calendar and groups for training and practical sessions will be established in coordination with the rest of maters at beginning of course. The Coordinator will produce the groups of students for these activities at beginning of course to avoid overlaps with other subjects.

Lectures: 3 hours per week, in both first and second term. Details are available from  
<http://ciencias.unizar.es/web/horarios.do>

Seminars, problems, etc. same time schedule as for the lectures.

Practical courses: there will be three practical courses along the academic year, each having a different number of hours. Dates, locations, and students attending every session will be announced in the classroom, in the notice board and in ADD.

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### 5.5. Bibliography and recommended resources

- Brock : Biología de los microorganismos / Michael T. Madigan, John M. Martinko, Paul V. Dunlap, David P. Clark ; coordinación Ricardo Guerrero. - 14ª ed. Madrid [etc.] : Pearson Education, 2015
- Introducción a la microbiología / Gerard J. Tortora, Berdell R. Funke, Christine L. Case . - 9ª ed. Buenos Aires [etc.] : Editorial Médica Panamericana, cop. 2007
- Microbiología de Prescott, Harley y Klein / Joanne M. Willey, Linda M. Serwood, Christopher J. Woolverton. - 7ª ed. (3ª ed. en español) Madrid [etc.] : McGraw-Hill, cop. 2009
- Clavel A. Guía para el diagnóstico de las enfermedades parasitarias. - 2ª edición Ed. KRONOS. 2009