Universidad Zaragoza

Year : 2019/20

27109 - Microbiology

Syllabus Information

Academic Year: 2019/20
Subject: 27109 - Microbiology
Faculty / School: 100 -

Degree: 446 - Degree in Biotechnology

ECTS: 9.0
Year: 2
Semester: Annual
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

Total or partial fraud or plagiarism in any of the evaluation tests will result in the immediate termination of the course for the student, who will get the lowest mark. Disciplinary actions will be undertaken, according to the University regulations on the field.

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented which includes the following 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: Practice sessions (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.

4.2.Learning tasks

The course includes the following learning tasks:

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

2) Practice sessions.

- 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.

4.3.Syllabus

The course will address the following topics:

Lectures

PART I: INTRODUCTION TO BIOLOGY OF MICROORGANISMS

- Topic 1: History, methods and fundamentals of Microbiology
- Topic 2: A perspective of microbial world
- Topic 3: Characteristics of prokaryotic microorganisms
- Topic 4: Microbial growth and metabolism
- Topic 5: Microbial growth control
- Topic 6: Antimicrobial agents
- Topic 7: Microbial genetics and molecular biology
- Topic 8: Host-pathogen interactions

PART II: MICROBIAL DIVERSITY

- Topic 9: General characteristics of viruses
- Topic 10: Plant and animal viruses
- Topic 11: Bacteriophages and other subcellular infectious agents
- Topic 12: Gram-negative bacteria (proteobacteria)
- Topic 13: Gram-positive bacteria
- Topic 14: Other phyla of Bacteria. Archaebacteria.
- Topic 15: Introduction to eukaryotic microorganisms: Fungi, algae, environmental protozoa.
- Topic 16: Parasitic protozoa
- Topic 17: Parasitology: nematodes
- Topic 18: Parasitology:cestodes and trematodes
- Topic 19: Parasitology: arthropods

PART III: APPLIED MICROBIOLOGY

- Topic 20: Clinical Microbiology
- Topic 21: Water Microbiology
- Topic 22: Soil Microbiology
- Topic 23: Food Microbiology
- Topic 24: Metagenomics and microbiome
- Topic 25: Industrial Microbiology

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

Practice sessions

- Part 1: Basic Microbiology procedures
- Part 2: Clinical Microbiology
- Part 3: Parasitology

4.4.Course planning and calendar

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 the subjects 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.

For students enrolled in the subject, places, times and dates of lectures and practical sessions will be public via Notice 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.

4.5.Bibliography and recommended resources

Updated bibliography and recommended resources can be accessed through the web page of the Library of the University of Zaragoza. http://biblos.unizar.es/br/br_citas.php?codigo=27109&year=2019