

Microbiology and Parasitology

Code: 103267
ECTS Credits: 6

Degree	Type	Year	Semester
2501925 Food Science and Technology	FB	1	2

Contact

Name: Francisco Javier Cabañes Sáenz
Email: Javier.Cabaner@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Maria Lourdes Abarca Salat
Maria Rosa Bragulat Arara
Francisco Javier Cabañes Sáenz
Joaquín Castellà Espuny
Gemma Castella Gómez
David Ferrer Bermejo
Ana Maria Ortuño Romero

Prerequisites

There are no official prerequisites, but students are advised to review the basic concepts of Biology and Chemistry.

Objectives and Contextualisation

This is a compulsory first-year subject. Students will acquire the knowledge and practical skills of Microbiology and Parasitology.

Student will also acquire a knowledge of the fundamentals of the taxonomy and the bases of bacteria, fungi and viruses.

The specific training objectives are:

- To introduce the student to the basic concepts of Microbiology and Parasitology.
- To provide knowledge of microbiological and parasitological techniques and methods.
- To know and differentiate the main types of microorganisms and parasites.

-To recognize and understand the role of microorganisms and parasites across many aspects (causative agents

These objectives are complemented with the subject "Experimentation in the laboratory". This subject is taught in the same semester and course. Its objectives are reflected in the respective teaching guide.

Competences

- Analyse, summarise, resolve problems and make professional decisions.
- Apply knowledge of the basic sciences to food science and technology.
- Apply the scientific method to resolving problems.
- Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
- Search for, manage and interpret information from different sources.
- Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Learning Outcomes

1. Analyse, summarise, resolve problems and make professional decisions.
2. Apply and interpret the results of basic microbiological techniques.
3. Apply the scientific method to resolving problems.
4. Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
5. Describe the methods for diagnosing and identifying parasites and their forms of propagation.
6. Interpret the diversity, physiology, metabolism and genetic bases that regulate the functions of microorganisms.
7. Interpret the principles behind the taxonomy and the systematics of bacteria, fungi, viruses and parasites.
8. Present the biology and physiology of the parasites of interest in nutrition.
9. Recognise the relationship between the microorganism or parasite and the host, and the virulence and mechanisms of pathogenicity.
10. Search for, manage and interpret information from different sources.
11. Use IT resources for communication, the search for information within the field of study, data processing and calculations.

Content

This subject is organized into two modules: Microbiology and Parasitology.

Module Microbiology: this module is structured into the following sections:

Section a. Introduction to Microbiology: Definition and brief history. Prokaryotic and eukaryotic microorganisms. Viruses and subviral agents. Microscopy: principles and types. Observation of microorganisms: techniques.

Section b. Microbial nutrition: Oxygen function. Nutritional types. Growth, isolation and conservation of microorganisms. Bacterial morphology: structure and function.

Section c. Bacterial genetics. Mutations. Genetic transfer: Transformation, transduction and conjugation. Plasmids. Transposons. Genetic recombination. Recombinant DNA technology. Applications and interest in Veterinary. Bacterial genomics. Regulation of gene expression.

Section d. Microbial metabolism: Fermentation, respiration and photosynthesis. Microbial growth. Measurement r

Section e. Microbial-host interactions. Mechanisms of pathogenicity and microbial structures in relation to pathogenicity. Control of microbial growth.

Section f. Systematic bacteriology. Introduction to bacterial taxonomy. Proteobacteria. Other Gram-negative bacteria (spirochetes, chlamydia and non-spore forming anaerobes). Low G+C Gram-positive bacteria. Mycoplasma. High G+C Gram-positive bacteria. Main groups and/or species of medical, industrial, biotechnological and ecological interest.

Section g. Mycology. Introduction to fungal taxonomy. Characteristics of filamentous fungi and yeasts. Techniques. Main groups and/or species of medical, industrial, biotechnological and ecological interest. Mycotoxins.

Section h. Virology. Characteristics of viruses and classification. Study techniques. DNA viruses. RNA viruses. Other viruses. Subviral agents

Module Parasitology: this module is structured into the following sections:

Section a. Generalities. Concept of parasitism. Concept of Parasitology. Types of hosts. Types of parasites. Biological life-cycles. Host-parasite interactions. Introduction to taxonomy, morphology and biology of the main groups of parasites.

Section b. Medically important Protozoa. Morphology, biology and identification.

Section c. Medically important Trematodes. Morphology, biology and identification.

Section d. Medically important Cestodes. Morphology, biology and identification.

Section e. Medically important Nematodes. Morphology, biology and identification.

Section f. Parasitic Arthropods. Mains groups and species of mites and insects. Morphology, biology and identification

Methodology

This subject applies the following methodology:

- Lectures: these lectures allow the acquisition of the basic scientific-technical knowledge of the subject; this knowledge must be complemented with a fuller study of the topics covered.
- Tutorials: these are informative sessions on the content, development and objectives of the different activities. In tutorials students have the opportunity to clarify any doubts about the course.
- Seminars: this activity aims to encourage group work, as well as to enhance the ability to synthesize, communicate and argue for a scientific topic. All necessary material for this activity will be provided in advance. Students will discuss their content in small groups in the classroom. The session will end with an assessment of the acquired knowledge.

All teaching materials used during the course will be posted on the Campus Virtual platform. Before each session, students will find the presentations (in pdf format) used in class by the teacher, as a support for taking notes. Students must inform themselves of the news and information published on the Campus Virtual.

Additional information: These objectives are complemented with the subject "Experimentation in the laboratory". This subject is taught in the same semester and course. Its objectives are reflected in the respective teaching guide. The teaching material used during the laboratory sessions will be posted on the Campus Virtual platform. Students will be issued with a Manual of Laboratory-Practical Sessions at the beginning of the course. This Manual should be printed out on the first day of the course in order to facilitate effective following of all laboratory sessions.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	46	1.84	3, 2, 5, 8, 6, 7, 9
Seminars	5	0.2	1, 3, 2, 10, 4, 5, 8, 6, 7, 9
Type: Supervised			
Tutorials	3	0.12	3, 2, 6, 7, 9
Type: Autonomous			
Cases/Problem Solving, reports	6.5	0.26	1, 3, 2, 4, 5, 8, 6, 7, 9
Reading	9	0.36	
Study	75	3	1, 3, 2, 4, 5, 8, 6, 7, 9

Assessment

Assessment is individual and continuous through different activities.

Module Microbiology (60% of the overall grade of the subject)

Self-learning activity in small groups (Maximum score: 25 points of the module grade): Students will work in small groups on a subject proposed by the teacher; all necessary material for this activity will be provided in advance. Assessment for the session is at both group and individual level. Each group will be scheduled for a specific session.

Written test (Maximum score: 75 points. of the module grade): on finishing all the teaching and training activities and on the date specified in the course program, students will take a written test on course content. For an average grade for assessment activities to be applicable, the minimum score obtained in the written test must be at least 35.

To pass the module Microbiology, a global score of at least 50 points/100 is required.

Students who do not meet the minimum score of the written test (35 points) or who fail to take the written test, will be able to retake it on the date scheduled for subject reassessment.

Module Parasitology (40% of the overall grade of the subject)

Written test: on finishing all the teaching and training activities and on the date specified in the course program, students will take a written test on course content.

To pass the module Parasitology a mark of at least 5 points/10 is required.

Students who do not meet the minimum score of the written test or who fail to take the written test, will be able to retake it on the date scheduled for subject reassessment.

If students performed less than 50% of the assessment activities, they will be graded as Non- assessable".

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
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Group Self-learning activity (Microbiology)	25% of the module	2	0.08	1, 3, 2, 4, 6, 7, 9
Written test (Microbiology)	75% of the module	1.5	0.06	2, 6, 7, 9
Written test (Parasitology)	100% of the module	2	0.08	10, 5, 8, 7, 9, 11

Bibliography

Microbiology Textbooks

- Carter GR, Wise DJ. 2004. 6th ed. "Essentials of Veterinary Bacteriology and Mycology". Wiley-Blackwell. ISBN: 9780813811796.

- Madigan MT, Martinko JM, Bender KS, Buckley DH, Stahl DA. 2015. 14th ed. "Brock Biología de los microorganismos". Pearson Educación, S.A. ISBN: 9788490352793.

- Willey JM, Sherwood LM, Woolverton CJ. 2009. 7a ed. "Microbiología de Prescott, Harley y Klein". McGraw-Hill-Interamericana, S.A.U. ISBN: 9788448168278.

Parasitology Textbooks

- Cordero del Campillo et al. 1999. Parasitología Veterinaria, 1ª edición. McGraw-Hill /Interamericana, Madrid.

- Urquhart GM, Armour J, Duncan JL, Dunn A.M, Jennings FW. 2001. Parasitología Veterinaria. Editorial Acribia, Zaragoza.

Websites

<https://micronow.org>

<http://microbewiki.kenyon.edu/index.php/MicrobeWiki>

<http://www.dpd.cdc.gov/dpdx/>