

Parasitology

Code: 101927
ECTS Credits: 3

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Maria Constenla Matalobos
Email: Maria.Constenla@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

Prerequisites

There are no official prerequisites, but it is advisable for the student to review the contents related to animal biology and cell biology of the subject of Biology of the High School, as well as the subjects of Microbiología Medica and Histologia de sistemas of previous courses of the degree

Objectives and Contextualisation

On successfully completing this subject, students will be able to demonstrate knowledge about the most important parasitic species, in terms of their specific and general characteristics, systematics, adaptations, biological cycles ... and interpret and understand their importance in the biodiversity of species. In addition, they must understand the effect that parasites have on the health of their hosts, know how to diagnose them and the role in modeling the ecology of their hosts, from different points of view: populations and communities.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Display knowledge of the bases and elements applicable to the development and validation of diagnostic and therapeutic techniques.
- Display knowledge of the basic life processes on several levels of organisation: molecular, cellular, tissues, organs, individual and populations.
- Display theoretical and practical knowledge of the major molecular and cellular bases of human and animal pathologies.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Read and critically analyse original and review papers on biomedical issues and assess and choose the appropriate methodological descriptions for biomedical laboratory research work.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.

- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Describe the most important groups of pathogenic microorganisms .
3. Explain the relationships between a possible pathogen and its host.
4. Identify the techniques used in the detection and identification of pathogens.
5. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
6. Recognise the diversity of the microbial world and identify the different groups it is composed of.
7. Recognise the role of microorganisms as agents of disease or toxicological problems in human beings, animals and plants.
8. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
9. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
10. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
11. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
12. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
13. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
14. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
15. Understand scientific texts and write review papers on immunology and biology.
16. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Content

The general contents are as follows *:

I GENERAL CONCEPTS

1. Parasitism. Basic concepts in parasitology. Categories of parasitism. Inlet, contact and penetration pathways of the parasites.
2. Life cycles of parasites. Types of host and parasites. Adaptations to parasitism

II DIVERSITY

3. Protists: excavates, alveolates, amoebozoa, opisthoconts (Microsporidia). Generalities, diversity, life cycles, pathogenesis and ecological role.
4. Platyhelminthes: Trematoda and Cestoda. Generalities, diversity, life cycles, pathogenesis and ecological role
5. Acanthocephala. Generalities, diversity, life cycles, pathogenesis and ecological role.
6. Nematodes. Generalities, diversity, life cycles, pathogenesis and ecological role
7. Parasitic arthropods: Arachnids, Insects. Pentastomids. Generalities, diversity, life cycles, pathogenesis and ecological role.
8. Zoonosis. Interest and classification. Food and water borne zoonoses. Environmental and food health measures.

III ADAPTATIONS AND EVOLUTION OF PARASITISM

9. Origin, evolution and specificity of parasitic species: Gradual adaptation to parasitism; origin of life cycles; origin and degrees of parasitic specificity.
10. Parasite-host balance. Host exploitation strategies. Host strategies against parasites. Evasion of the immune response. Virulence.

IV PARASITIC ECOLOGY

11. Introduction to parasitic ecology. Hierarchical nature of parasitic populations and communities.
12. Effect of parasites on host populations.

* Unless the restrictions imposed by the health authorities force a prioritization or reduction of these contents.

Methodology

The subject applies the following methodology*:

Theoretical sessions:

The contents will be taught mainly by the teacher with the support of videos and animations related to the topics discussed in class and / or with activities to assess student learning, by solving issues raised by the teacher. The visual aids used in class will be available in the Campus Virtual. With these lectures the student acquires the basic scientific-technical knowledge of the course, but it should be complemented with the personal study of the topics explained. It is advised that students consult regularly the books recommended in the Bibliography section to consolidate and clarify, if necessary, the contents explained in class.

Seminars:

The seminars work on the scientific-technical knowledge exposed in the lectures to complement their understanding, developing several activities such as the analysis and discussion of audiovisual material or scientific articles, the resolution of issues related to the topics, analysis of parasitological information, talks by professionals, etc. The seminars are characterized by the active work of the student and their aim is to promote the capacity for analysis and synthesis, critical reasoning and problem-solving capacity. In addition, a small part of the contents will also be explained by the students during the seminars with a work that must be presented as an oral presentation to the rest of the students.

Laboratory classes:

The students perform the experimental work individually or in pairs and under the supervision of the professor. Before beginning each practice session, the student must have read the practice guideline to know the objectives of the practice, the basics and the procedures that they must perform and the protocol that they must develop. The objective of the laboratory classes is to complement and reinforce the knowledge acquired with lectures and seminars. Practical sessions will be stimulated and developed in the student empirical skills such as the ability to observe, analyse and recognize parasitological diversity. At the beginning of each laboratory class there will be an introduction explaining the theoretical foundations of the practice to be

performed. At the end of each practice the students will answer a questionnaire, so that the assessment of the practices is continued.

Laboratory practices consist of:

- 2 sessions to become familiar with the identification of different taxonomic groups (2,5h).
- 2 sessions destined to work the process of obtaining and preparing the parasitological material (2,5h). In addition, they will also estimate parasitological parameters needed to quantitatively describe the level of infestation by a parasite species that is the basis for any subsequent ecological study.

Tutorials:

The purpose of these sessions is to resolve doubts, clarify basic concepts and guide the sources consulted by the students. Likewise, these tutorials allow the orientation of the work that the students will do for the seminars.

*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practical sessions	10	0.4	2, 4, 8, 9, 6, 16
Seminars	4	0.16	1, 14, 13, 15, 3, 5, 12, 11, 10, 8, 9, 7, 16
Theoretical sessions	12	0.48	14, 13, 2, 3, 5, 9, 7, 6
Type: Supervised			
Tutorials	3	0.12	1, 14, 13, 5
Type: Autonomous			
Preparation of work and resolution of questions	16.5	0.66	1, 14, 13, 15, 5, 12, 10, 8, 9, 7, 6, 16
Study and resolution of problems	25	1	1, 13, 15, 3, 11, 9, 7, 6

Assessment

The assessment of this subject is continuous. Students must provide evidence of their progress by completing tasks and tests*:

Assessment of the theory classes:

There are two partial tests and a second-chance test.

Partial exams: In this part, the students' knowledge of the subject will be assessed individually, as well as their capacity for analysis and synthesis, and of critical reasoning. There will be 2 partial exams (a mark of at least 5 out of 10 is required to successfully pass the partial exam).

Second-chance test: Students who failed one or both partial exams can reassess them. The student must previously have submitted a minimum of two-thirds of the course-assessment items.

Therefore, students will obtain the "Not assessable" qualification when the assessment activities carried out have a weighting of less than 67% in the final grade. Likewise, students who wish to improve the grade of one or both partial exams can be re-assessed. Be aware that in this case, previous mark will be lost.

The mark corresponding to the two exams has a global weight of 50% of the final mark.

Assessment of seminars:

Both oral works (content, capacity for synthesis, rigor in the expression, quality of documentary sources and timing) and written activities are assessable, as well as the participation and assistance during the seminars. In addition, the topics discussed during seminars may be included in partial exams.

The mark corresponding to the seminars has a global weight of 20% of the final mark.

Assessment of the laboratory classes:

After each practice the student will perform an individual test that assess the use and achievement of the specific competences and the contents of each practice. Likewise, the involvement of the students in the activities during the practices will also be valued. Attendance at practical sessions is mandatory. Students will be identified as "Not assessable" when their absence exceeds 20% of the scheduled sessions.

The mark corresponding to the laboratory classes has a global weight of 30% of the final mark.

Final Considerations:

A minimum mark of 4 is required in each of the different parts to successfully pass the subject.

Students will obtain the "Not assessable" qualification when the assessment activities carried out have a weighting of less than 67% in the final mark.

*Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical sessions	30%	0	0	2, 4, 5, 11, 8, 9, 6, 16
Seminars	20%	0	0	1, 14, 13, 15, 3, 5, 12, 11, 10, 8, 9, 7, 16
Theoretical sessions	50%	4.5	0.18	1, 14, 13, 2, 3, 12, 10, 8, 9, 7, 6

Bibliography

Books:

-BUSH, A.O., FERNANDEZ, J.C., ESCH, G.W., SEED, J.R. (2001). *Parasitism. The Diversity and Ecology of Animal Parasites*. Cambridge University Press, Cambridge.

-CHENG TC (1986) *General Parasitology*, 3rd ed. Academic Press, New York.

-ESCH G.W., FERNÁNDEZ J.C. (1993). *A functional biology of parasitism. Ecological and evolutionary implications*. Chapman & Hall, London.

-GÁLLEGO-BERENGUER (2006). *Manual de Parasitología. Morfología y biología de los parásitos de interés sanitario*. Publicacions i edicions de la Universitat de Barcelona

- POULIN, R. (2007). *Evolutionary ecology of parasites*. Princeton University Press, Princeton.
- POULIN, R., MORAND S. (2004). *Parasite Biodiversity*. Smithsonian Books, Washington.
- HALTON D.W., BEHNKE J.M., MARSHALL I. (EDS) (2001). *Practical exercises in parasitology*. Cambridge University Press.
- ROBERTS, L.S., JANOVY, J. JR. (2000). *Foundations of Parasitology*, 6th Edition, Wm. C. Brown Publishers, Dubuque.
- SULLIVAN J.T. (2000). *Electronic Atlas of Parasitology*. McGraw Hill.

On-line books:

- Human parasitology: <https://mirades.uab.cat/ebs/items/show/155209>

Websites:

<http://tolweb.org/tree>

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

<http://asp.unl.edu/index.php>