

Microscopic Anatomy

Code: 100781
ECTS Credits: 6

Degree	Type	Year	Semester
2500250 Biology	OT	4	2

Contact

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Use of Languages

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

Prerequisites

A working knowledge of Histology 1 and 2 course content is required.

A basic level of English is recommended (B1 of the Common European Framework)

To have the right to attend the laboratory classes, the student must show that he/she has passed the biosafety tests uploaded in the Virtual Campus.

Objectives and Contextualisation

In the Biology Bachelor's degree, "Histology of organs and systems":

is an elective subject in the 4th year, concerning the cellular and tissue bases of animal organs and systems. It has been designed assuming students have a basic knowledge of histology that will facilitate they acquire a comprehensive understanding and an integrated approach to the organization of animals.

The theoretical and practical nature of this subject allows linking scientific concepts with practical work.

The main goals of the subject are:

1. Recognize, in terms of cell biology, the diversity of animal organs.
2. Acquire the integrative concept of organ from a morpho-functional perspective.
3. Know about the structure, organization and basic functioning of different animal organs.
4. Understand and describe the organs that constitute different systems.
5. Identify the variety of cell and tissue components of animal organs by microscopy.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Be able to analyse and synthesise

- Be able to organise and plan.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- 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.
- Understand the processes that determine the functioning of living beings in each of their levels of organisation.

Learning Outcomes

1. Analyse a situation and identify its points for improvement.
2. Be able to analyse and synthesise.
3. Be able to organise and plan.
4. Critically analyse the principles, values and procedures that govern the exercise of the profession.
5. Interpret animal organs and systems as sets of tissues laid out in accordance with precise patterns of organisation and function.
6. Propose new methods or well-founded alternative solutions.
7. 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.
8. 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.
9. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
10. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
11. 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.
12. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
13. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.

Content

THEORY LECTURES

Unit 1. Nervous system.

Unit 2. Sensory organs.

Unit 3. Integumentary system.

Unit 4. Digestive system.

Unit 5. Respiratory apparatus.

Unit 6. Excretory apparatus.

Unit 7. Male reproductive system.

Unit 8. Female reproductive system.

Unit 9. Cardiovascular apparatus.

Unit 10. Immune system.

Unit 11. Endocrine system.

LABORATORY PRACTICES

Practice 1. Nervous system and sensory organs. Microscopic analysis of the brain, neocortex, cerebellar cortex, spinal cord, nerve, spinal ganglion, eye and ear.

Practice 2. Digestive system. Microscopic analysis of tongue, tooth, esophagus, stomach, intestine, salivary glands, liver and pancreas.

Practice 3. Respiratory and excretory apparatus. Microscopic analysis of trachea, bronchi, lung, kidney and urinary bladder.

Practice 4. Male and female reproductive system, and mammary gland. Microscopic analysis of testis, epididymis, ovary, uterus and mammary gland.

Methodology

Histology of Organs and Systems includes theory lectures, seminars and practical classes.

Theory Lectures

The subjects of teaching units will be taught in 36 sessions. They will be taught using audiovisual material prepared by the teacher. Students will have such material available in the Virtual Campus.

Seminars

The scheduled seminars are designed in order to students work in small groups to acquire teamwork and critical thinking skills. Students will be divided into working groups for a specific program topic, followed by oral presentations and collective discussion.

The organization of the groups and the distribution of topics to be discussed will take place during the first seminar.

In the remaining seminars, groups of students must deliver in writing their proposed topic to the professor. Each group of students will present the topic orally to the rest of the class with the resources available in the classroom.

The recommended bibliography and scientific articles related to the subject of study will be posted on the Virtual Campus.

Seminar attendance is mandatory.

Tutorials

Tutoring will be done personally in the professor's office (times to be arranged). Tutorials should be used to clarify concepts and consolidate the knowledge acquired by the personal work of the student. They can also be useful to answer questions that students may have about the preparation of seminars.

Laboratory practices

Practical sessions will be taught in small groups of students (about 20 per session) in the laboratory. They are designed to complement the theoretical training. Students will perform microscopy diagnoses and will deliver individual questionnaires.

Monitoring the practical classes also involves the collection of individual observations from microscopic examination in a portfolio of activities (Virtual Campus).

Practical class attendance is mandatory.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
LABORATORY PRACTICES	12	0.48	5, 2, 3
SEMINARS	3	0.12	2, 3
THEORY LECTURES	36	1.44	5, 2
Type: Supervised			
TUTORIALS	5	0.2	5
Type: Autonomous			
PREPARATION OF SEMINARS	25	1	5, 2, 3
QUESTIONNAIRES RESOLUTION	2.5	0.1	5
STUDY	60	2.4	5, 2, 3

Assessment

The evaluation of the course will be continued through individual tests of theoretical and practical knowledge and group activities scheduled on the seminars.

The evaluation system is organized into three sections, each of which is independently evaluated:

Written exams (weight 60% of the final mark). The knowledge acquired by students will be evaluated through test exams. There will be two midterm exams (eliminatory) throughout the course and a final re-assessment test (see program of the subject).

Seminars (weight 20% of the final mark). This section assesses the ability of analysis and synthesis of students in each group, as well as cooperative learning and oral presentation skills.

Seminars will be assessed as follows:

Written work	50%	The professor evaluates (from 1 to 10) the works delivered by each group of students.
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Oral presentation	20%	The professor evaluates (from 1 to 10) the oral presentations skills of each group of students.
Inter-group mark	15%	Each working group evaluates (from 1 to 10) the groups that present orally their subject of study.
Intra-group mark	15%	Within each working group, each student assesses (from 1 to 10) to his co-workers at the last seminar.
TOTAL	100%	

Seminar attendance is mandatory. In case of absence to any session, without justification, there will be a penalization in the final mark of the seminar:

- Absence 1 session = 20% reduction of the mark
- Absence 2 sessions = 40% reduction of the mark
- Absence 3 sessions = 80% reduction of the mark

Practicals (weight 20% of the final mark). This section evaluates the practical knowledge acquired individually by each student.

Practicals will be assessed according with two modalities:

1. Evaluation of the content at the end of each practical class (50% of the mark). Students will respond, in a limited time, to a questionnaire and will make a diagnosis of structures using microscopic examination.

The grade will be the average of the marks obtained in each practical session.

2. Global test of microscopic diagnostic skills (50% of the mark). This test will consist in the diagnosis of structures through microscopic examination proposed along the course.

To weigh the marks obtained in these two modalities, the student must achieve a mark greater than or equal to 4 (out of 10) on each of them.

Attendance at practicals is mandatory. In case of absence to any session, without justification, the mark corresponding to this practical will be 0.

Students who obtain a final mark lower than 5 (out of 10) cannot compensate it with marks corresponding to written theory tests and seminars. Therefore, they must do a re-assessment final test consisting in a microscopic diagnosis plus questions and answers.

To pass the course the requirements to be met are:

- Obtain at least 5 points, out of 10, in the average score of written theory tests and seminars.
- Obtain at least 5 points, out of 10, in the practical sessions.

The presentation of the student to any re-assessment test (theory and/or practices) automatically removes the mark previously obtained.

Students who have shown evidence of learning with an overall score of less than 50% will be marked as "not evaluated".

Repeat students:

Repeat students will not repeat a particular written test, seminar or practical if he/she has obtained at least a minimum mark of 5 in any of them. This exemption will be maintained for a period of three additional enrolments in the subject.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practicals	20%	1	0.04	13, 12, 4, 1, 5, 6, 11, 10, 9, 7, 8, 2, 3
Seminars	20%	0.5	0.02	13, 12, 4, 1, 5, 6, 11, 10, 9, 7, 8, 2, 3
Written exams	60%	5	0.2	13, 12, 4, 1, 5, 6, 11, 10, 9, 7, 8, 2, 3

Bibliography

Texts

Fawcett, D.W. Bloom, W: Tratado de Histología. 12a. edición (ed. Interamericana-McGraw Hill).

Gartner, L.P. Texto de Histología. Atlas a Color. 7a. edición (ed. McGraw Hill).

Geneser, F.: 4a. edición Histologia (ed. Panamericana).

Krstic, R.V.: Los tejidos del hombre y de los mamíferos (ed. McGraw Hill).

Krstic, R.V.: Human Microscopic Anatomy (ed. Springer-Verlag).

Ross, M.H. Histología. Texto y Atlas. Correlación con Biología Molecular y Celular. 8a. edición (ed. Wolters Kluwer).

Villaro, A.C. Histología para estudiantes. 1a. edición (ed. Panamericana).

Welsch. U.: Sobotta Histología. 3a. edición (ed. Panamericana).

Atlas

Boya, J.: Atlas de Histología y Organografía microscópica 3a. edición (ed. Panamericana).

Eroschenko, V.P. Atlas of Histology with Functional Correlations. 13a. Edición (ed. Wolters Kluwer).

Gartner, L.P. Texto de Histología. Atlas a Color. 7a. edición (ed. McGraw Hill).

Kühnel, W.: Atlas color de Citología e Histología. 11a. Edición. (ed. Panamericana).

Young, B. O'Dowd, G. Woodford, P. Histología funcional. Texto y Atlas en Color (Wheater) 6a. edición (ed. Elsevier. Churchill Livingstone).

Digital atlas

<http://www.histologyguide.com/>

<http://histologyatlas.wisc.edu/>

<https://patologi.com/atlas%20cytologi%20histologi.pdf>

<http://www.histology-world.com/>

<https://www.anatomyatlases.org/>

<https://www.ouhsc.edu/histology/>

<https://histology.medicine.umich.edu/>

<https://histologylab.cbl.columbia.edu/HistologyLabManual.pdf>

Digital books

<https://onlinelibrary-wiley-com.are.uab.cat/doi/book/10.1002/3527604669>

<https://onlinelibrary-wiley-com.are.uab.cat/doi/book/10.1002/9781118789568>

<https://www.visualhistology.com/text-atlas-book/free-online-histology-text-atlas/>

<https://allmedicalpdfs.com/download-wheaters-functional-histology-pdf-6th-edition-latest/>

<https://www.kasem.info/links/text-books>

<https://www.pdfdrive.com/human-histology-books.html>

The most important documents

Fawcett, D.W. Bloom, W: Tratado de Histología. 12a. edición (ed. Interamericana-McGraw Hill).

Gartner, L.P. Texto de Histología. Atlas a Color. 7a. edición (ed. McGraw Hill).

Krstic, R.V.: Human Microscopic Anatomy (ed. Springer-Verlag).

Ross, M.H. Histología. Texto y Atlas. Correlación con Biología Molecular y Celular. 8a. edición (ed. Wolters Kluwer).

<https://www.pdfdrive.com/human-histology-books.html>

Software

The presentation program used is: "Microsoft PowerPoint"