



IDENTIFYING DATA

Animal and plant histology and cytology II

Subject	Animal and plant histology and cytology II			
Code	V02G030V01403			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Molist García, María del Pilar			
Lecturers	Álvarez Otero, Rosa María Megías Pacheco, Manuel Molist García, María del Pilar			
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Web				
General description	Cytology and plant and animal histology II is one of the mandatory subjects that is taught in the second semester of the 2nd year of the Degree of Biology. This course exposes the basic biological principles of microscopic organization of animal and plant tissues, and their assembly in the constitution of organs. It aims to know the anatomy and morphology of plant and animal tissues and organs and the various cell types that compose them. It is an English friendly subject.			

Skills

Code	
A1	Students should prove understanding and knowledge in this study field that starts in the Secondary Education and with a level that, even though it is supported in advanced books, also includes some aspects that involve knowledge from the vanguard of the study field.
A2	Students should know how to apply their knowledge to their work or vocation in a professional way. They also should have the competences that are usually proved through the elaboration and defence of arguments and the resolution of problems within their study field.
A3	Students should prove ability for information-gathering and interpret important data (usually within their study field) to judge relevant social, scientific or ethical topics.
A4	Students should be able to communicate information, ideas, issues and solutions to all audiences (specialist and unskilled audience).
B2	Ability of reading and analyzing scientific papers and having critical assessment skills to understand data collection, deducing the main idea from the least relevant ones and basing on the corresponding conclusions.
B3	Acquisition of general knowledge about the basic subjects of biology, both at theory and experimental level, without dismissing a higher specialization in subjects that are oriented to a concrete professional area.
B4	Ability in handling experimental tools, both scientific and computer technology equipment that support the search for solutions to problems related to the basic knowledge of biology and with those of a concrete labour context.
B5	Understanding of the levels of organization of living beings from a structural (molecular, cellular and organic) and functional point of view by observing their relations with the environment and other organisms, as well as their appearances in situations of environmental alteration.
B7	Collection of information about issues of biologic interest, analysis and emission of critical opinions and reason them including the reflection about social and/or ethical aspects related to the issue.
B10	Development of analytic and abstraction skills, the intuition and the logical and rigorous thought through the study of biology and its uses.
B11	Ability to communicate in detail and clearly: knowledge, methodology, ideas, issues and solutions to all audiences (not only qualified but unskilled in Biology).
B12	Ability to identify their own educational necessities in the biology field and in concrete labour areas and to organize their learning with a high grade of autonomy in any context.
C2	Recognizing different levels of Living systems organization. Performing phylogenetic analysis and identifying evidence of evolution.

C3	Identifying, analysing and characterizing biological samples, including those of human origin, and possible anomalies.
C4	Isolating, analysing and identifying biomolecules, viruses, cells, tissues and organs.
C21	Processing and interpreting bioessays and biological diagnoses.
C25	Gathering background information, develop experimental work and analysing data results
C28	Teaching and sharing knowledge and resources related to Biology
C31	Knowing and handling technical and scientific apparatus.
C32	Knowing and handling basic or specific key concepts and terminology
C33	Understanding the social projection of Biology.
D1	Development of capacity of analysis and synthesis
D2	Acquisition of the organization and planning capacity for tasks and time
D3	Development of oral and writing communication abilities
D4	Acquisition of foreign language knowledge related to the study field
D5	Use of computer resources related to the study field
D6	Research and interpreting of information from different sources
D9	Ability to work in collaboration or creating groups with an interdisciplinary character
D10	Development of the critical thinking
D14	Adquisition of abilities in the interpersonal relationships

Learning outcomes

Expected results from this subject	Training and Learning Results			
New	A1	B2 B3 B5	C2 C32	D1 D2 D5 D6
(*)				
New	A1	B2 B4 B5 B7	C2	D2 D5 D6
New		B3 B5	C2 C3 C4 C32	D1 D4 D5 D6
New	A2 A3	B10	C3 C4 C21 C31	D1 D5 D6
New	A3	B12	C21 C31	D1 D14
New		B3 B4 B5 B7	C21 C25 C31	D6 D10
New	A4	B11	C28 C33	D3 D9
New			C31 C32	

Contents

Topic

Lesson 1.- INTRODUCTION TO THE ANIMAL TISSUES: COATED AND GLANDULAR EPITHELIA.

Histogenesis and differentiation of animal tissues. General characteristics of the epithelia. Types of epithelial cells and functions. The basement membrane: location and composition. Histogenesis. Coating epithelia: classification and localization. Special types. Epithelial regeneration and regeneration. Glandular epithelia. Secretion: concept and types. Classification and function. Exocrine and endocrine glands. Control of secretion.

Lesson 2.- THE CONNECTIVE TISSUE: VARIETIES. ADIPOSE TISSUE.

General characteristics: cell types and extracellular matrix. Varieties of connective tissue: characteristics and location. Adipose tissue: types, morphological and functional characteristics. Histogenesis.

Lesson 3.- SUPPORTING TISSUES: CARTILAGINOUS, BONE AND CORDAL TISSUES.

Cartilage: general characters: cell types and extracellular matrix. Histogenesis and growth. Varieties. Degeneration and regeneration. Cordial tissue. Bone tissue: cell types and extracellular matrix. Types of bone and varieties. Ossification: intramembranous and endochondral. Functional aspects

Lesson 4.- BLOOD AND LYMPH. THE IMMUNE RESPONSE.

Blood: general characteristics. Plasma. Blood elements: types and functions. Agglutination and coagulation. Lymph: composition and formation. Hematopoiesis. Lymphopoiesis. Cellular bases of immunity. Humoral and cellular immunity.

Lesson 5.- THE MUSCLE TISSUE.

Generalities and classification. Skeletal, smooth and cardiac muscle: organization and structure, innervation and contraction. Histogenesis, growth and regeneration. Modifications of muscle tissue: the electrical organs.

Lesson 6.- THE NERVOUS TISSUE.

Generalities. Neurons: characteristics, classification and organization. Glia: types, characteristics and functions. Synapsis: types and classification. CNS: organization. PNS: organization. Clinical examples of synaptic function.

II. Thematic block. Histology and microscopic plant organography

Lesson 7.- THE VEGETABLE CELL AND THE VEGETABLE ORGANISM.
Characteristics of the plant cell. The cell wall: structure, formation and growth. Specializations of the cell wall: plasmodesms and pits. Basic organization of the upper floors. Plant organs: general arrangement of tissue systems: Main features. Formation of the body of the plant.

Lesson 8. MERISTEMS

Concept. Cytological characteristics. Classification: primary and secondary meristems.

Lesson 9.- PARENCHYMA AND nd FABRICS OF SUSTAIN.

Parenchyma: structure, functions and types. Collenchyma: structure and varieties. Sclerenchyma: cellular types.

Lesson 10.- VASCULAR TISSUES: XYLEM AND PHOEM.

Characteristics and celular types of xylem. Organization of primary and secondary xylem. Phloem: organization and cell types. Function and structure. Vascular tissues in the primary and secondary growth of the plant: structure and differentiation.

Lesson 11.- PROTECTION AND GLANDULAR TISSUES.

Epidermis: cell types. The cuticle. Stomas: structure, function and differentiation. Trichomes. Periderm: structure. Lenticel. Activity of the phellogen: the rhytidom. External and internal secretory structures.

Lesson 12.- VEGETATIVE ORGANS.

Root, stem and leaves: tissues organization in primary and secondary growth.

Lesson 13.- REPRODUCTIVE ORGANS. FLOWER, FRUIT AND SEED

Structure of the flower. Histology of stamens: microsporogenesis and formation of pollen grain. Histology of carpels: megasporogenesis and development of the embryonic sac. Germination of pollen grain. Fertilization. The fruit and the seed.

III thematic Block: Practices

Practice 1. Tegument and associated glands. Hair follicle. Glands of the endocrine system: thyroid and adrenal.

Practice 2. Digestive system: tongue, esophagus, stomach, intestine. Glands associated with digestive I: salivary.

Practice 3. Glands associated with digestive II: pancreas and liver. Circulatory system: blood and heart.

Practice 4. Respiratory system: trachea and lung. Excretory system: kidneys.

Practice 5. Nervous system: spinal cord. Plant organography: root and leaves.

Practical 6. Plant organography: stems.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	35	70	105
Laboratory practical	12	18	30
Seminars	3	4	7
Self-assessment	0	4	4
Case studies	0	4	4

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

Description

Lecturing	Presentation by the teacher of the basic concepts of the subject in order for the student to acquire the skills. Dialogue and discussion in class will be promoted based on some practical example. Questionnaires will be conducted after each topic or group of topics, whose questions will be asked mostly in English. The presentations will also have a percentage of slides in English to facilitate learning for foreign students. It is an English friendly subject. Questionnaires will be taken after each topic or group of topics, the questions will be asked mostly in English. The presentations will also have a percentage of slides in English to facilitate learning for foreign students. It is an English friendly subject.
Laboratory practical	Introduction of the practice by the teacher followed by the microscopic identification of tissues and organs, following the script that will be available on the Tema platform prior to its realization. Acquisition of basic skills associated with observation and histological description.
Seminars	In the seminars the teacher will give a general explanation of several topics, after which each student will have to expose with the support of two or three photographs the knowledge previously explained. In addition there will be problems that students will have to solve in small groups.

Personalized assistance

Methodologies	Description
Lecturing	In addition to the advice and clarifications that are made during the theory classes, students will be attended individually in the tutoring hours. Attention to the student can be done via telematics (email, videoconference, fatic forums, etc.) under the modality of prior agreement.
Laboratory practical	In addition to the advice and clarifications that are made during the theory classes, students will be attended individually in the tutoring hours. Attention to the student can be done via telematics (email, videoconference, fatic forums, etc.) under the modality of prior agreement.
Tests	Description
Self-assessment	In addition to the advice and clarifications that are made during the theory classes, students will be attended individually in the tutoring hours. Attention to the student can be done via telematics (email, videoconference, fatic forums, etc.) under the modality of prior agreement.
Case studies	In addition to the advice and clarifications that are made during the theory classes, students will be attended individually in the tutoring hours. Attention to the student can be done via telematics (email, videoconference, fatic forums, etc.) under the modality of prior agreement.

Assessment

	Description	Qualification	Training and Learning Results			
Lecturing	The concepts acquired in the classroom will be evaluated in the official exam of the subject. This exam will include questions (short, large and test), in which there will be an interrelation of concepts acquired in the magisterial session, laboratory and / or seminars	50				
Laboratory practical	The concepts acquired in the laboratory sessions will be evaluated in three follow-up tests carried out every two practices and a final test coinciding with the official examination of the subject. In all of them the student will have to identify different structures in images or schemes, such as cell types, tissues, organs, type of growth or group of plants, structures also explained in the classroom	24	A2 B3 A3 B4 A4 B12	C2 C3 C4	D2 D5 D6	
Seminars	The evaluation of the seminar will be made on a continuous basis throughout the course, based on the quality of the student's participation.	11	A3 B2 A4 B3 B7 B10 B11	C28 C32	D2 D3 D9 D10 D14	
Self-assessment	Self-assessment questionnaires will be carried out throughout the course. Through the Fatic platform, students will complete 5 questionnaires throughout the semester. Each questionnaire will deal with a group of lessons on the agenda. They will take place before the beginning of the theoretical classes and will last 10 minutes.	15	A3 B5	C32	D4	

Other comments on the Evaluation

Attendance to theory classes, practices and seminars is mandatory for all students and will be subject to rigorous control in the second year students. Continuous monitoring of attendance to theory and practice, as well as intervention in the seminar debates, will be used to monitor the performance of the student. The student will have to have at least 80% of attendance to the different activities to be evaluated.

The evaluation of the subject Cytology and Histology Animal and Plant II will combine written tests and continuous evaluation throughout the course.

A) Evaluation of the seminar.

The evaluation of the seminar (maximum value: 1,1 point out of 10) will be carried out continuously during the course. As there are three seminars the value of each will be 0.3 points. This note is achieved by assessment of knowledge, and attendance at the three seminars will add the remaining 0.2. The inclusion of the value of the seminar in the final grade of the subject will be carried out if and only if the student is submitted to the official examination of the subject.

The qualification of the seminar will be kept within the current course.

B) Practical Assessment

Throughout the practices will be carried out three tests that will mainly consist of the identification of tissues and / or organs through the observation of slides. Each test will have a maximum value of 0.8 points over 10. The qualification of the practices will remain within the current course.

C) Theoretical valuation

There will be two written tests where the theoretical knowledge of the subject will be assessed. In these tests, questions integrating theoretical and practical knowledge may be asked. The maximum value of both tests is 5 points out of 10, of which 3.5 points will correspond to the part of animal histology that will be carried out on the official date and the rest, 1.5 points will correspond to the part of plant histology, which will take place once that part is finished.. The format of questions will be varied and may include:

- 1) Short answer questions.
- 2) Questions that link the identification of images / schemes with theoretical concepts.
- 3) Test questions (single / multiple answer), based on knowledge acquired in the classroom and in the laboratory.

D) Assessment of the questionnaires (self-evaluation)

Throughout the development of the subject, 5 self-assessment questionnaires will be carried out using the FAITIC platform. Each questionnaire will comprise questions corresponding to a group of theoretical lessons. They will take place in the classroom and each one will have a value of 0.3 points.

E) Final grade of the subject. To pass the subject, it is necessary to surpass 50% of the theoretical part (2,5) and 50% of the practical part (1,2). Otherwise, the final grade will be the result of multiplying the total grade (theory + practices + seminars) by 0.5.

According to the scale determined by the University of Vigo, the subject of Cytology and Histology Animal and Plant II will have numerical qualification with only one decimal, with the following equivalence:

NOT SUBMITTED, will be the student who does not take the final exam.

NOT PASS: 0-4,9

PASS: 5-6.9

NOTABLE: 7-8.9

OUTSTANDING: 9-10

HONOR REGISTRY: Awarded to students who have obtained a grade of 9 or higher. Their number may not exceed 5% of students enrolled in a subject in the corresponding academic year, unless the number of students enrolled is less than 20 , In which case, a single Matriculation of Honor may be granted.

The dates of the exams and the class schedules can be consulted in the web page of the faculty being susceptible of modification in special circumstances.

<http://bioloxia.uvigo.es/es/docencia/grado-en-biologia/horarios>

Sources of information

Basic Bibliography

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John T. Hansen, **Netter's Anatomy Coloring Book: with Student Consult Access**, 2ªed, Elsevier Masson, 2015

Complementary Bibliography

Carr, J.H., Rodak B., **Atlas de Hematología Clínica.**, 4ª edición, Médica Panamericana, 2014

Freund, M., **Hematología. Guía práctica para el diagnóstico microscópico.**, 11ª edición., Médica Panamericana, 2011

Gartner, L.P., Hiatt, J.L., **Atlas en Color y Texto de Histología.**, 6ª edición, Médica Panamericana., 2015

Junqueira, L.C., Carneiro, J., **Histología Básica. Texto y Atlas.**, 12ª edición., Médica Panamericana, 2015

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Young, B., Woodford, P., O'Dowd, G., **Wheater's Functional Histology: A Text and Colour Atlas.**, 5ª edición, Elsevier Churchill Livingstone, D.L. ., 2014

Donald McMillan Richard Harris, **An Atlas of Comparative Vertebrate Histology**, 1st Edition, Academic Press, 2018

Pawlina, W., **Ross Histología. Texto y atlas. correlación con la Biología Molecular y Celular.**, 8edición, Wolters Kluwer, 2020

Recommendations

Subjects that are recommended to be taken simultaneously

Biochemistry II/V02G030V01401

Subjects that it is recommended to have taken before

Biochemistry I/V02G030V01301

Other comments

A responsible commitment to learning reflected in the attitude throughout the course and in the aptitude associated with the acquisition of knowledge, will enable the passing of the subject. Studying the subject in a continuous way will enable the student to participate actively in the course. Knowing, understanding, reflecting and reasoning about the basic knowledge of the course, with a mature attitude, will be useful to participate in the different activities proposed by the teaching staff and guarantee of success in the course

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===

=== ADAPTATION OF METHODOLOGIES === MIXED MODALITY

Teaching methodologies that are maintained

Laboratory practices and seminars, at the proposal of the Dean, maintain the presence of all students in their respective groups, maintaining the highest security conditions and following the established hygiene and cleaning standards.

* Teaching methodologies that are modified

The master classes will keep the number of classes and content. However, and due to the need for social distancing, the classes will be face-to-face for a part of the student, and virtual for the rest of the students, for which the classes will be offered live but through a remote campus.

* Non-face-to-face service mechanism for students (tutorials)

The tutorials will be carried out through the virtual offices of each teacher enabled on the remote campus by appointment. They can also be done by email, using the FAITIC forums, or by phone.

The contents will be the same

- * Additional bibliography to facilitate self-learning

Through online resources that are already in the bibliography

- * Other modifications

=== ADAPTATION OF THE EVALUATION === VIRTUAL MODALITY

Teaching methodologies that are maintained

- * Teaching methodologies that are modified

Master classes and seminars are held but the classes are virtual offered live through the remote campus of the University of VIGO.

The practical classes will be carried out using material available on the internet. basically atlas of histology and organography.

The contents will not be modified.

The evaluations of the evaluation system are not modified. Seminars and practical tests will preferably be done in the classroom and / or laboratory but in exceptional cases virtual platforms will be used. The theoretical exams will be done online either in the classroom or at home.
