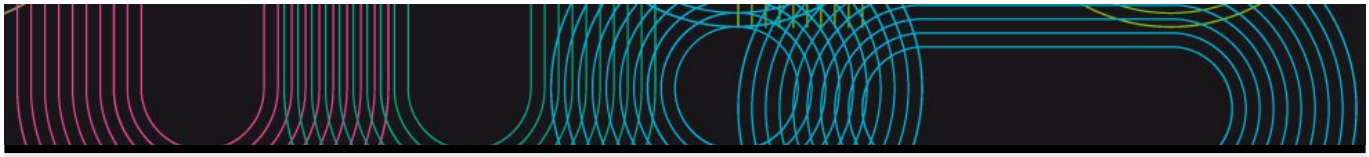

IDENTIFYING DATA				
Animal and plant histology and cytology I				
Subject	Animal and plant histology and cytology I			
Code	V02G031V01203			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Spanish Galician English			
Department				
Coordinator	Pombal Diego, Manuel Ángel			
Lecturers	Megías Pacheco, Manuel Miguel Villegas, Encarnación de Molist García, María del Pilar Pérez Fernández, Juan Pombal Diego, Manuel Ángel			
E-mail	pombal@uvigo.es			
Web				
General description	(*)Mandatory subject of the 2nd year of the Degree in Biology. This subject presents the general characteristics of cells as well as their ultrastructural organization, finishing the programme with cell division processes and the first stages of living beings development.			

Training and Learning Results	
Code	
A1	Students should prove understanding and knowledge in this study field that starts in the Secundary Education and with a level that, even though it is suppported 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 able to communicate information, ideas, issues and solutions to all audiences (specialist and unskilled audience).
B1	Developing autonomous learning by identifying their own training need and organizing and planning tasks and time.
B3	Apply the knowledge acquired in the degree and use the scientific-technical instrumentation and CIT in contexts of Biology and/or related to the professional practice.
B6	Develop analysis and synthesis, critical reasoning and argumentation skills, applying them in Biology and other scientific-technical disciplines.
C1	Solve problems by applying the scientific method, the concepts and terminology specific to biology, mathematical models and statistical and computer tools.
C4	Isolate, identify and growth microorganisms, cells, tissues and organs, making easier their study and the assessment of their metabolic activity.
C6	Understanding and integrate the functioning of living beings (cellular, tissue, organ and individual level), explaining their homeostatic and adaptive responses.
D1	Understand the meaning and use of the gender perspective in the different fields of knowledge and in professional practice with the aim of achieving a fairer and more equal society.
D3	Commitment to sustainability and the environment. Equal, sensible and efficient use of resources.

Expected results from this subject	
Expected results from this subject	Training and Learning Results

Know the types and levels of organization	A1 A3	B3 B6	C4	
Know the structure and function of the eukaryotic cell	A1 A3	B3 B6	C4	
Understand the biology of animal and plant development	A1 A2 A4	B1 B3 B6	C1 C6	
Apply Cytology and Histology knowledge to isolate, identify and analyze specimens and samples of biological origin, as well as to characterize their cellular and molecular constituents	A2 A3	B3 B6	C4	D3
Apply knowledge and technology related to Cytology and Histology in aspects related to the production, exploitation, analysis and diagnosis of biological processes and resources	A3	B3 B6	C1 C4	
Obtain information, carry out experiments and interpret the results	A3 A4	B3 B6	C1 C4 C6	
Understand the social projection of Cytology and Histology and its impact on professional practice, as well as knowing how to use its contents to teach and disseminate	A2 A4		C6	D1 D3
Know and manage the concepts, terminology and scientific-technical instrumentation related to Cytology and Histology	A3 A4	B3 B6	C1 C4 C6	

Contents

Topic	
CELL BIOLOGY	(*)
Introduction	Evolution of the cell concept Cell theory General organization of eukaryotic cells Differences and similarities between animal and plant cells.
Cell membrane and extracellular matrix	Structure, molecular composition and functions Membrane transport Cell adhesion.
Origin of membranes and intracellular trafficking	Endoplasmatic reticulum. Golgi apparatus. Vesicular trafficking. Endosomes.
Lysosomal system, peroxisomes and vacuoles	Cell digestion. Autophagy. Peroxisomes and glyoxysomes. Vacuoles: types, structure and functions.
Organelles involved in energy production	Mitochondrial structure and function. Chloroplast structure and function. Other plastids.
The Cytosol	Cytoplasmic inclusions. The Cytoskeleton: actin filaments, microtubules and intermediate filaments.
The nucleus	Nuclear envelop. Dynamic and structure of chromatin and chromosomes. The nucleolus.
DEVELOPMENTAL BIOLOGY	(*)
Cell cycle	Control of the cell cycle.
Cell division	Cell division Mitosis. Meiosis. Cell death: apoptosis and necrosis.
Gametogenesis and fertilization	Oogenesis and spermatogenesis. Fertilization.
Stages of the embryonic development	Early development. Determination and cell differentiation.
LAB SESSIONS	(*)
Session 1. Cell types and extracellular matrix	Observation of cell types and extracellular matrix at light microscopy.
Session 2. Organelles I	Identification of cell organelles at light microscopy
Session 3. Organelles II	Identification of cell organelles in electron microscopy images.
Session 4. Mitosis.	Observation and quantification of mitotic phases in animal and plant tissue
Session 5. Gonads.	Observation of spermatogenesis and oogenesis. Types of gonads.
Session 6. Early development.	Observation of the early development of invertebrates and vertebrates.

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	33	82	115
Laboratory practical	12	12	24

Seminars	3	5	8
Objective questions exam	1	0	1
Objective questions exam	1	0	1
Laboratory practice	0.5	0	0.5
Laboratory practice	0.5	0	0.5

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

Methodologies

	Description
Lecturing	The contents of the subject will be explained with presentations and short videos.
Laboratory practical	Histology preparations related to different topics covered will be analyzed. In additon, a lab session will be dedicated to study the ultrastructure of the cell and another one to the early vertebrate development.
Seminars	Analysis and discussion of questions proposed by the students or by the instructor.

Personalized assistance

Methodologies	Description
Lecturing	Invidual support is offered during tutor hours. Students will be able to contact the teacher for tutorial sessions via telematic tools (e-mail, video-chat, forums of FAITIC platform, etc.) in concerted appointments.
Laboratory practical	Invidual support is offered during tutor hours. Students will be able to contact the teacher for tutorial sessions via telematic tools (e-mail, video-chat, forums of FAITIC platform, etc.) in concerted appointments.
Seminars	Some activities will be proposed for monitoring the evolution of each student.

Assessment

	Description	Qualification	Training and Learning Results			
Seminars	Evaluation of the work developed during the seminars	10	A1 A2 A4	B6	C1 C6	D1 D3
Objective questions exam	Exam evaluating the theoretic classes	40	A1 A2 A3	B1 B6	C1 C6	
Objective questions exam	Exam evaluating the theoretic classes	30	A1 A2 A3	B1 B6	C1 C6	
Laboratory practice	Exam evaluating the lab sessions	10		B3	C4	D1 D3
Laboratory practice	Exam evaluating the lab sessions	10		B3	C4	D1 D3

Other comments on the Evaluation

- Attendance to the theoretical, practical and seminar classes is compulsory unless absence is duly justified.
- To pass the course it is necessary to score higher than 40 % in both the theoretical part (sum of the two tests) and the practical part (sum of the two tests). Otherwise, the final grade will be the result of multiplying the total grade (theory + practical + seminars) by 0.5.
- If the final mark of the course does not reach 5 points, but exceeds 40 % of any of the parts (theory, practical or seminars), these scores will be maintained for the second exam opportunity (July), provided that the student requests it.
- Repeat students from other courses must take all the classroom and laboratory activities (seminars and lab sessions), of which they will be evaluated.
- Lectures. The first thematic block (Cellular Biology) will be evaluated over 4 points in a first exam of objective questions that will be established in the official calendar. The second thematic block (Developmental Biology) will be evaluated over 3 points in a second exam of objective questions to be held on the date of the final exam to be established by the faculty. The maximum score of the theoretical part in the final grade will be 7 points (4+3).

- Lab sessions. The lab sessions will be evaluated in two tests over 1 point each one. The first test will be assessed over 1 point by means of an exam of objective questions that will include the identification of microscopic structures in photomicrographs and will be carried out on the date established by the faculty. The second test will also be evaluated over 1 point by means of an exam of the same type as the first test and will be carried out on the date established by the faculty. Therefore, a maximum of 2 points of the total grade can be obtained with this evaluation.

- Seminars. They will be evaluated in three tests over 0.33 points each one, that will be carried out during the seminar itself. Therefore, with this evaluation a maximum of 1 point of the total grade can be obtained.

- Students who do not follow the continuous evaluation will be evaluated in a single test over 10 points that will include objective questions on the content of the subject and will be held on the date of the final exam set by the faculty.

- Exam to improve the mark. Students who pass the subject in the first term, and wish to improve their mark, may take an exam to improve their grade, which will be held on a date and time to be determined in agreement with the professor.

- Absent. It will be considered when the student does not perform any activity that involves evaluation.

- Date of the final exam. The exam dates are available on the faculty□s website: http://bioloxia.uvigo.es/gl/docencia/exames

- Schedules of the subjects. The schedules of the subject are available at the following address: http://bioloxia.uvigo.es/gal/docencia/horarios

Sources of information

Basic Bibliography

Cooper, G. M. Adams, K. W., **The Cell: a Molecular Approach.**, 978-1605358635, 9th ed, OUP USA, 2023

Complementary Bibliography

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Hardin, J.; Lodolce, J. P., **Becker's World of the Cell**, 978-0-137-44177-8, 10th ed, Pearson, 2022

Lodish, H., Matsudaira, P., Baltimore, D., Berk, A., Zipursky S.L.; Darnell, J., **Molecular Cell Biology.**, 978-1464187445, (8th ed), W.H. Freeman and Company, 2016

Paniagua, R., Nistal, M., Sesma, P., Álvarez-Uría, M.; Fraile, B.; Anadón, R.; Sáez, F. J., **Biología Celular y Molecular**, 978-84-486-1297-9, 4th ed, McGraw Hill, 2017

Megías, M.; Molist, P.; Pombal, M.A., **Atlas de histología vegetal y animal, Recurso audiovisual. http://mmegias.webs.uvigo.es/inicio.html**,

Barresi, M. F. J.; Gilbert, S.F., **Developmental Biology.**, 978-0-197-57459-1, 13th ed, OUP USA, 2023

Wolpert, L.; Tickle, Ch.; Martínez-Arias, A., **Principles of Development**, 978-0198800569, 6th ed, Oxford Univ Press, 2019

Browder, L.W.; Erickson, C.A.; Jeffery, W.R., **Developmental Biology.**, 0-03-013514-1, (3th ed), Saunders, 1991

Slack, J. M. W.; Dale, L., **Essential Developmental Biology**, 978-1119512851, 4th ed, Wiley-Blackwell, 2021

Alberts, B.; Hopkin, K.; Johnson, A.; Morgan, D.; Roberts, K.; Walter, P.; Heald, R., **Essential Cell Biology**, 978-1-324-03348-6, 6th ed, W. W. Norton & Company, 2023

Recommendations

Subjects that are recommended to be taken simultaneously

Biochemistry I/V02G031V01201
Botany I: Algae and fungi/V02G031V01202
Microbiology I/V02G031V01204
Zoology 1: Non-arthropod invertebrates/V02G031V01205