



## IDENTIFYING DATA

### Technics in cellular and molecular biology

Subject	Technics in cellular and molecular biology			
Code	V02G031V01310			
Study programme	Grado en Biología			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language	Spanish			
Department				
Coordinator	Morán Martínez, María Paloma			
Lecturers	de Carlos Villamarín, Alejandro Leonides Faro Rivas, Jose Manuel Galindo Dasilva, Juan Megías Pacheco, Manuel Morán Martínez, María Paloma Pérez Fernández, Juan Suárez Alonso, María del Pilar			
E-mail	paloma@uvigo.es			
Web				
General description	<p>Matter essentially practical whose mission is the acquisition of experience in the employment of molecular technicians, cellular and *histológicas advanced. It pretends show the possibilities of such technicians and complete and extend the knowledges purchased pole student in the matter of basic technicians of laboratory of the first course of degree and in the practices of laboratory of the matters of the course second of degree. For this will make different experimental protocols in the laboratory that are considered how advanced pole his technical and conceptual level. The different technicians will group in modules second his relation with distinct areas of the *BioloXía. The educational method is mainly based in the work of laboratory, but also incorporates complementary readings and tools to achieve an integration of the knowledges of the diverse fields and can apply them the an experimental problem from different technical points of view. The material of work will be, at least partly, in English.</p> <p>The schedules of the matter and dates of the examination can consult in official links of web page gives faculty.</p>			

## Training and Learning Results

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.
B2	Manage scientific-technical information using diverse and reliable sources. Analyze data and documents and interpret them critically and rigorously, including considerations on their social relevance and in the professional field of Biology.
B4	Draft and write reports, documents and projects related to Biology. Proceed to their presentation and debate in the teaching and specialized areas, highlighting the competences of the degree.
C2	Identify levels of organisation of living beings through the study of current specimens and fossils. Carry out phylogenetic analyses and study the mechanisms of heredity, evolution and biodiversity.
C4	Isolate, identify and growth microorganisms, cells, tissues and organs, making easier their study and the assessment of their metabolic activity.
C5	Manipulate and analyse genetic material and determine its alterations and pathological implications. Knowing the applications of genetic engineering.
C6	Understanding and integrate the functioning of living beings (cellular, tissue, organ and individual level), explaining their homeostatic and adaptive responses.

- C10 Identify biological and biotechnological processes and their potential applications, in particular in health, agri-food and environmental fields.
- C11 Perform and interpret bioassays, identify chemical and biological agents, including pathogens, as well as their toxic products. Develop and apply biological control techniques.
- D4 Collaborate and work in teams or multidisciplinary groups, promote negotiation skills and the ability to reach agreements.

### Expected results from this subject

Expected results from this subject	Training and Learning Results			
Recognise the versatility, potentiality and limitations of the technicians applied to the Biology.	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4
Know and handle the concepts, terminology and scientific instrumentation-technical relative to technicians of laboratory.	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4
Know apply technicians to isolate, identify, handle and analyse specimens and samples of biological origin, as well as to characterise his cellular and molecular constituents.	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4
Comprise the experimental base that bears the current knowledge on the molecular bases of the biological information and his expression.	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4

### Contents

Topic	
Cellular and molecular analysis (Module I ,12 h)	Organs lymphoid, extraction of cells lymphoid cellular SeparationCounting and cellular feasibility cellular Conservation ELISA
Technicians advanced in microscopy (Module II, 12 h)	Inmunocitochesmisty Microscopy Of fluorescence Electronic microscopy
Purification and characterisation of proteins (Module III, 20 h)	Spectrometry of masses of proteins Chromatography of proteins Electrophoresis of proteins Assessment of the enzymatic activity of proteins
Recombinant DNA and sequencing (Module IV, 20 h)	Extraction of nucleic acids PCR and quantification Cloning and transformation Gene Expression Sequencing analysis

### Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	0.5	0	0.5
Laboratory practical	58	0	58
Autonomous problem solving	0	39	39
Report of practices, practicum and external practices	0	29	29
Objective questions exam	0.75	11	11.75
Objective questions exam	0.75	11	11.75

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

### Methodologies

	Description
Introductory activities	It describes the method of work that goes to be followed
Laboratory practical	It presents to the student of the most real form the experimental character of the Biology
Autonomous problem solving	It can be proposed in some modules with material in English, Galician or Spanish. It allows to purchase a better understanding of an experimental technician and a greater autonomy in his realisation. In some modules will be necessary to use computer tools or make mathematical calculations and /or statisticians.

### Personalized assistance

Methodologies	Description
Laboratory practical	Personalized attention to resolve any doubt that have arisen during the teaching of the matter. The doubts can consult in the hours of *tutoría weekly.
Autonomous problem solving	Personalized Attention to resolve any doubt that have arisen during the realisation of the no face-to-face activities. The doubts can consult in the hours of tutorials.

### Assessment

	Description	Qualification	Training and Learning Results			
Laboratory practical	It evaluates the degree of interest and participation of the student, the punctuality and know be, in addition to the assimilation of the work developed during the practices.	20	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4
Autonomous problem solving	They evaluate the knowledges purchased in the practical sessions, as well as the correction in the form to express in the tongue employed, English, Galician or Spanish (in particular, the grammatical construction, spelling and coherence of the text).	10	A1 A2 A3	B2	C2 C5 C6 C10 C11	D4
Report of practices, practicum and external practices	They evaluate the knowledges purchased in the practical sessions, as well as the correction in the form to express in the tongue employed, English, Galician or Spanish (in particular, the grammatical construction, spelling and coherence of the text).	20	A1 A2 A3	B2 B4	C2 C4 C5 C6 C10 C11	D4
Objective questions exam	They evaluate the knowledges purchased in the practices and the complementary activities of the modules of cellular biology and of biochemistry	25	A1 A2 A3			
Objective questions exam	They evaluate the knowledges purchased in the practices and the complementary activities of the modules of immunologies and of genetics	25	A1 A2 A3			

### Other comments on the Evaluation

TBCM is a subject with mandatory practical sessions. Unjustified absence from one or more laboratory sessions is incompatible with passing this subject.

TBCM is a course that consists of four consecutive laboratory modules (Cell Biology, Biochemistry, Genetics, and Immunology) with continuous evaluation divided into two parts.

Part A: 50% of the final grade is determined by the sum of the grades obtained in each module. These grades can come from various activities such as result submissions, notebooks, solved questionnaires, or others, submitted on time. A minimum of three out of ten points must be obtained in each module. Circumstances such as lack of punctuality or a demotivated or negligent attitude in the laboratories can lower the final scores.

Part B: The remaining 50% of the final grade comes from the completion of 2 written tests, where questions related to the contents of the four completed modules are asked. Again, a minimum of three out of ten points must be obtained in each module's corresponding part.

If a student has a justified absence from two or more laboratory sessions, continuous evaluation is not possible. In that case, students would have to take an exam to pass the subject, in the form of a written test that consists of two parts:

Theoretical part (50% of the final grade): Four exams with questions about the contents of each of the four modules that make up the subject. A minimum of three out of ten points must be obtained in each module to pass.

Practical part (50% of the final grade): Resolution of a practical case from each of the four modules that compose the subject. Similarly, a minimum of three out of ten points must be obtained in each module.

### Sources of information

#### Basic Bibliography

Faro, J (coordinador e editor), **Manual de técnicas experimentais en bioloxía molecular e celular**, Servizo de Publicacións da Universidade de Vigo, 2014

Punt, J, Stranford, S, Jones, P y Owen, JA, **Kuby Immunology**, 8ª, WH Freeman and Co, 2019

Lefkovits, I, **Immunology methods manual: the comprehensive sourcebook of techniques**, 1997

Green, RM, **Molecular Cloning: A Laboratory Manual, Fourth Edition**, 2012

Nelson, DL y Cox, MM, **Lehninger: principios de bioquímica, 7a ed**, 2018

Bozzola, JJ y Russell, LD, **Electron microscopy : principles and techniques for biologists**, 1999

Hunter, E, **Practical electron microscopy: a beginner's illustrated guide**, 1993

Hayat. MA, **Principles and techniques of electron microscopy: biological applications**, 2000

#### **Complementary Bibliography**

Valverde, D, Megías, M y Morán, P,

[https://www.youtube.com/channel/UCck6B5Y\\_qUD8T2a5OB7lc-g/videos?shelf\\_id=0&view=0&sort=dd](https://www.youtube.com/channel/UCck6B5Y_qUD8T2a5OB7lc-g/videos?shelf_id=0&view=0&sort=dd),

---

#### **Recommendations**

#### **Other comments**

It recommends work in the matter of continuous form, review the basic mathematics, included the resolution of equations of first degree, \*logaritmos, exponential, linear interpolation, and basic statistics, included linear regression by square minima, and analysis of variance.