

		Teachin	g Guide		
Identifying Data					2017/18
Subject (*)	Biochemistry and Molecular Biology Code			610G02013	
Study programme	Grao en Bioloxía				
		Desci	riptors		
Cycle	Period	Ye	ear	Туре	Credits
Graduate	2nd four-month period	Th	ird	Obligatoria	6
Language	SpanishEnglish				
Teaching method	Face-to-face				
Prerequisites					
Department	Bioloxía				
Coordinador	Freire Picos, María Ángeles		E-mail	maria.freirep@udo	e.es
Lecturers	Freire Picos, María Ángeles E-mail maria.freirep@udc.es		e.es		
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Web	ciencias.udc.es/bcm				
General description	Biochemistry and Molecular Biole	ogy include the	study of the life to the	ne level of the molecules	s involved in it and the
	interactions between them. Now a days, those studies are the base of a lot of investigations (from the biomedical area to				
	the molecular aspects applied to the study of natural populations, agricultural applications, environmental, etc). This course				
	will cover the basic molecular aspects of life as mRNA and protein synthesis or the gene expression regulation mediated by				
	signal transduction systems. This course, at the 3rd level of the Biology Degree, aims to increase the student?s				
	knowledges in this area as to de-	velop his capac	ity to relate informat	tion and apply it in the re	esolution of different practical
	cases as well as experiment proposals or small research projects.				

	Study programme competences
Code	Study programme competences
A8	Illar, analizar e identificar biomoléculas.
A12	Manipular material xenético, realizar análises xenéticas e levar a cabo asesoramento xenético.
A17	Realizar bioensaios e diagnósticos biolóxicos.
A27	Dirixir, redactar e executar proxectos en Bioloxía.
A29	Impartir coñecementos de Bioloxía.
A30	Manexar adecuadamente instrumentación científica.
A31	Desenvolverse con seguridade nun laboratorio.
B1	Aprender a aprender.
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar en colaboración.
B7	Comunicarse de maneira efectiva nunha contorna de traballo.
B10	Exercer a crítica científica.
B11	Debater en público.
B13	Comportarse con ética e responsabilidade social como cidadán e como profesional.

Learning outcomes	
Learning outcomes	Study programme
	competences



The approach of the Master Classes is to improve the knowledge and the ability of reflection on a discipline that also, once in	A8	B1	
the professional field, will demand a good praxis and adhere to ethical principles. The Laboratory Classes are more focused	A12	B2	
on the expertise on know how to do and how to be, related to the field of the Biochemistry and Molecular Biology.	A17	B3	
	A27	B4	
	A29	B5	
	A30	B7	
	A31	B10	
		B11	
		B13	

Contents			
Торіс	Sub-topic		
1Basal Transcription	RNA polymerases, core promoter and general transcription factors. Transcription mechanism: initiation, elongation and termination. Methodology to study: transcription start site selection, transcriptional termination and interactions nucleic acids-proteins.		
2Regulated transcription and chromatin involvement in transcriptional regulation	Activators and repressors. DNA binding domains: DNA-proteins interactions. Chromatin remodeling complexes. Acetilation, deacetilation and other histones modifications in the regulation of gene expression. Techniques to study transcriptional regulation. Regulation examples of specific genes		
3RNA processing and coordination of co-transcriptional events in eukaryotes	RNA cleavage and polyadenylation. RNA splicing. Processing of ribosomic and transferent RNA		
4RNA as regulator of gene expression	RNA edition. Control of mRNA quality. Function of snRNA and transcriptional regulation. sncRNAs and the gene silencing mechanism. Antisense RNA in the translational regulation and applications of RNA. RNomics aspects		
5Protein Translation	General aspects. Ribosomes. Translation mechanism: Initiation, elongation and termination. Differences in eukaryotes. Translation in mitochondria. Translational inhibitors.		
6Protein Processing	Postranslational modifications of proteins. Folding: Chaperones and Prions. Ubiquitination and SUMOilation. Programed degradation: Proteasome		
7Protein Transport	Cotranslational and postranslational translocation. Classification and distribution of new synthesized proteins. Traffic nucleo-cytoplasm. Transport regulation and final destiny of proteins in the cell.		
8Basics of Cell Signaling	Classification of intercellular communication. Stages of intracellular signaling. Organization of signaling and pathways. Signaling molecules: types and functions.		
9 Reception of external signals and intracellular transduction	Membrane and intracellular receptors: types and mechanisms of activation. Intercellular Messenger substances or Second Messengers, protein kinase cascades and signal transduction to nucleus.		
10 Examples of control mechanisms and coordination of cell	Cell Growth and Proliferation: regulation of cell cycle, apoptosis and cancer. Cell		
physiological activities	Senescence Signaling.		

	Planning	g		
Methodologies / tests	Competencies	Ordinary class	Student?s personal	Total hours
		hours	work hours	



Laboratory practice	A8 A12 A17 A27 A30	15	22.5	37.5
	A31 B1 B2 B3 B4 B5			
	B7 B10 B13			
Problem solving	A29 B1 B2 B3 B4 B5	7	14	21
	B7 B10 B11 B13			
Guest lecture / keynote speech	A29 B2 B3 B4 B7 B10	24	60	84
	B11 B13			
Document analysis	A29 B1 B3 B5 B7 B10	1	2	3
	B11 B13			
Mixed objective/subjective test	A29 B2 B3 B7 B10	2.5	0	2.5
	B13			
Personalized attention		2	0	2

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

	Methodologies
Methodologies	Description
Laboratory practice	Focused on the study of gene expression, with the use of databases, with the analysis of reporter genes expression and/or
	with the study of protein expression.
Problem solving	This section will include the approach and resolution of problems of different aspects in small groups of students, combining
	the methodologies of problem-based learning and collaborative work.
Guest lecture /	Oral Presentation complemented with audiovisual media to transmit knowledges and provide the learning. Besides it will
keynote speech	improve the participation of the students.
Document analysis	
Mixed	It will be used for the evaluation of the knowledge, skills, attitudes, and so, acquired by the student along the course, and will
objective/subjective	include different types of questions: multiple answer, short, etc.
test	

	Personalized attention
Methodologies	Description
Laboratory practice	The tasks to perform by the student will be guided by the Professor. It is important the regular attendance to Tutorials with the
Problem solving	Professor, who will help to monitor the progress of the students.
Guest lecture /	
keynote speech	The specific tutorial Schedule for students will be given at the begining of the course. Apart from that, students can e-mail the
Document analysis	professors to solve specific questions or to make tutorial appointments.

		Assessment	
Methodologies	Competencies	Description	Qualification
Laboratory practice	A8 A12 A17 A27 A30	LABORATORY CLASSES: The assistance is mandatory. The students will interpret	20
	A31 B1 B2 B3 B4 B5	the obtained results. Besides they will present a work that will include a small	
	B7 B10 B13	research project based on the results in the practical course.	
Mixed	A29 B2 B3 B7 B10	FINAL EXAMINATION: The knowledges obtained by the students in the Master and	50
objective/subjective	B13	Small Group Classes will be evaluated in a final exam.	
test			
Problem solving	A29 B1 B2 B3 B4 B5	Resolution of problems, student's work in Small Groups: seminars and possibility of	22.5
	B7 B10 B11 B13	small exams.	
Document analysis	A29 B1 B3 B5 B7 B10	Activity for extraction and handling information working in groups. Preparation of a	7.5
	B11 B13	divulgative activity to be presented in the reduced groups class. It will include a	
		discussion part among the students and teacher.	



Assessment comments

.-It is necessary to have passed all the 3 evaluable parts: Activities (seminars, problems, work in reduced groups) Practical classes and Final Exam, INDEPENDENTLY, to sum up and pass the course.

.-Ahead to the Final Qualification, in the ACTS (in either of the 2 Options: June or July), only the notes of the parts (Final Exam, Practical Classes, and Seminars) will be added if the Final Exam reached the 45 % of its value. Otherwise, if not reach that percentage, in the ACTS only the note of the Final Exam will appear. .-In the Final Exam of the 2nd Option_(July), the student will be able to recover only the theoretical parts (Final Exam) of the 1° Option_June. It will not be an exam for the practical part in the 2° Option_July. .-The attendance to Practical classes is a necessary condition to be evaluated. Not attendance without a proper justification prevents to approved the course. .-The students who had passed the Practical Part in previous academic years may apply for a request for his validation as approved(PASS). .-To obtain: Not Presented, in the ACTS, the student may not have participated in more than 15% of evaluable scheduled activities..-According to the rule of qualifications and records in Grades and Masters, the Quality Committee of the Faculty of Sciences agreed to the recommendation to concede the ?Honors Qualification? to those students who obtained the highest marks in the 1st Option_June..-For students with part-time dedication or waiver assistance, in January and July there will be a specific exam for overall assessment. .-Exceptionally, in the case of a student, for duly justified reasons, could not perform any of the tests of continuous assessment, the Professor will adopt the decisions appropriate for this purpose..-Apart from the exams for English students, and due to the fact that English is a transversal competence y Biology degree, some materials and short questions in class and exams (related to the work in reduced groups and practical course) could be in English. In the case of doubt, the teacher will help the student to understand the question.

	Sources of information
Basic	- Meister G. (2011). RNA Biology. Wiley-VHH
	- Lodish, Berk, Krieger, Kaiser et al., (2013). Molecular Cell Biology. WhFreeman
	- Herráez, A. (2012). Texto inlustrado de Biología Molecular e ingeniería genética. Elsevier
	- Lodish, Berk, Matsudaria, Kaiser et al., (2008). Biología Celular y Molecular. Ed. Médica Panamericana
	- Lewin B. (2011). Genes X. Jones and Bartlett Publishers, LLC
	- Elliot, W.H. & amp; Elliot, D.C. (2002). Bioquimica y Biologia Molecular. Ariel, S.A.
	- Whitford, D. (2005). Proteins: Structure and Function. John Wiley & amp; Sons, Ltd.
	- Bruce, Alberts [et al.]. (2008). Molecular biology of the cell. New York : Garland Science, 5th ed.
	- Karp G. (2011). Biología Celular y Molecular. Conceptos y experimentos. McGraw-Hill Interamericana Eds., S.A. de
	C.V., traducción de la 6ª ed. de Cell and Molecular Biology
	- Stryer, L, Berg, J.M. %Tymoczko, J.L. (2013). Bioquímica: con aplicaciones clínicas. Ed. Reverté, 7ª Ed.
	Na plataforma Moodle incluiránse enlaces a páxinas web relacionadas cos diferentes contidos dos temas.
Complementary	- Rhoads R. (2010). miRNA Regulation of the translational machinery. Springer
	- Dalbey, R.E. & amp; von Heijne, G. (2002). Protein targeting, transport & amp; translocation. Academic Press
	- Meyers, R.A. (2007). Proteins: from analytical to structural genomics (Volume I and II). Wiley-VCH Verlag GmbH
	& Co.
	- Krauss, Gerhard. (2008). Biochemistry of signal transduction and regulation Weinheim : Wiley-VCH. 2nd ed.

Recommendations
Subjects that it is recommended to have taken before
Bioquímica I/610212101
Bioquímica II/610212202
Molecular Genetics/610G02020
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Fundamentos Bioquímicos de Biotecnoloxía/610212620
Other comments
It is recommended to attend both group and individual tutoring to get best results.



(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.