Teaching Guide				
Identifying Data				2015/16
Subject (*)	Bioquímica e Bioloxía Molecular		Code	610G02013
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Third	Obligatoria	6
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía Celular e Molecular			
Coordinador	Rodriguez Belmonte, EstherFreire Picos, María Ángeles	E-mail	esther.belmonte@udc.esmaria.freirep@udc.es	
Lecturers	Freire Picos, María Ángeles Rodriguez Belmonte, Esther Rodriguez Torres, Ana Maria Varela Eirín, Marta	E-mail	maria.freirep@udc.es esther.belmonte@udc.es ana.rodriguez.torres@udc.es marta.varelae@udc.es	
Web	ciencias.udc.es/bcm			
General description	Biochemistry and Molecular Biology include the study of the life to the level of the molecules 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 develop his capacity to relate information and apply it in the resolution of different practical cases as well as experiment proposals or small research projects.			

Study programme competences / results	
Code	Study programme competences / results
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 / results

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

Contents	
Topic	**Sub-topic**
1.-Basal 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.
2.-Regulated 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
3.-RNA processing and coordination of co-transcriptional events in eukaryotes	RNA cleavage and polyadenylation. RNA splicing. Processing of ribosomic and transferent RNA
4.-RNA 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
5.-Protein Translation	General aspects. Ribosomes. Translation mechanism: Initiation, elongation and termination. Differences in eukaryotes. Translation in mitochondria. Translational inhibitors.
6.-Protein Processing	Postranslational modifications of proteins. Folding: Chaperones and Prions. Ubiquitination and SUMOilation. Programed degradation: Proteasome
7.-Protein 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.
8.-Basics 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 physiological activities	Cell Growth and Proliferation: regulation of cell cycle, apoptosis and cancer. Cell Senescence Signaling.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**

Laboratory practice	A8 A12 A17 A27 A30 A31 B1 B2 B3 B4 B5 B7 B10 B13	15	22.5	37.5
Problem solving	A29 B1 B2 B3 B4 B5 B7 B10 B11 B13	8	16	24
Guest lecture / keynote speech	A29 B2 B3 B4 B7 B10 B11 B13	24	60	84
Mixed objective/subjective test	A29 B2 B3 B7 B10 B13	2.5	0	2.5
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 / keynote speech	Oral Presentation complemented with audiovisual media to transmit knowledges and provide the learning. Besides it will improve the participation of the students.
Mixed objective/subjective test	It will be used for the evaluation of the knowledge, skills, attitudes, and so, acquired by the student along the course, and will include different types of questions: multiple answer, short, etc.

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

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Laboratory practice	A8 A12 A17 A27 A30 A31 B1 B2 B3 B4 B5 B7 B10 B13	LABORATORY CLASSES: The assistance is mandatory. The students will interpret the obtained results. Besides they will present a work that will include a small research project based on the results in the practical course.	20
Mixed objective/subjective test	A29 B2 B3 B7 B10 B13	FINAL EXAMINATION: The knowledges obtained by the students in the Master and Small Group Classes will be evaluated in a final exam.	50
Problem solving	A29 B1 B2 B3 B4 B5 B7 B10 B11 B13	Resolution of problems, student's work in Small Groups: seminars and possibility of small exams.	30

Assessment comments

.-It is necessary to have approved all the 3 evaluable parts: Seminars&Problems, Practical Classes and Final Examination independently to do the sum and pass the course.

.-For the Final Qualification (in any of the 2 Options: June or July), if the sum of the notes is greater than 5 points but any of the parts is suspended, in the records it will appear 4.9.

.-The attendance to Practical clases is mandatory.

.-The students who had passed the Practical Part in previous academic years may apply by request for his validation as approved(PASS).

.-To obtain: Not Presented, the student may not have participated in more than 15% of evaluable scheduled activities.

.-In the final examination of the 2nd Option_(July), the student will be able to recover the theoretical parts of the course. It will not be an exam for the practical course in the second oportunity.

.-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 Op-June.

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. & Elliot, D.C. (2002). Bioquimica y Biologia Molecular. Ariel, S.A. - Whitford, D. (2005). Proteins: Structure and Function. John Wiley & 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. In the MOODLE Platfform will be included links to webpages related to different subjects of the Course.In the MOODLE Platfform will be included links to webpages related to different subjects of the Course.
Complementary	- Rhoads R. (2010). miRNA Regulation of the translational machinery. Springer - Dalbey, R.E. & von Heijne, G. (2002). Protein targeting, transport & 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 Xenética molecular/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.