Teaching Guide				
Identifying Data				2020/21
Subject (*)	Molecular Microbiology		Code	610441010
Study programme	Mestrado Universitario en Bioloxía Molecular , Celular e Xenética			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	BioloxíaDepartamento profesorado máster			
Coordinador	Cid Blanco, Angeles	E-mail	angeles.cid@udc.es	
Lecturers	Cid Blanco, Angeles Poza Domínguez, Margarita	E-mail	angeles.cid@udc.es margarita.poza.dominguez@correo.udc.es	
Web				
General description	PENDIENTE DE INCLUIR POR LOS SERVICIOS DE GADU LOS SIGUIENTES PROFESORES DEL INIBIC: Germán Bou Arévalo (germanbou@canalejo.org) Margarita Poza Domínguez (Margarita.Poza.Dominguez@sergas.es) Mª del Mar Tomas Carmona (ma.del.mar.tomas.carmona@sergas.es)			
Contingency plan	1. Modifications to the contents None 2. Methodologies *Teaching methodologies that are maintained Master sessions, seminar and short answer test *Teaching methodologies that are modified If necessary, the teaching would be telematic, the internship would be replaced by individual guided work and the examination would be carried out telematically 3. Mechanisms for personalized attention to students The master classes and some tutorials would be given by Teams in a synchronous way. Tutorials could also use e-mail asynchronously and without specific timing. The Moodle platform would be used for the exams on the dates set for this purpose 4. Modifications in the evaluation None *Evaluation observations: If face-to-face laboratory practices are discontinued, the individual work that would replace them will carry the same weight in the evaluation 5. Modifications to the bibliography or webgraphy None			

Study programme competences / results	
Code	Study programme competences / results
A1	Skills of working in a sure way in the laboratories knowing operation handbooks and actions to avoid incidents of risk.
A2	Skills of using usual techniques and instruments in the cellular, biological and molecular research: that are able to use techniques and instruments as well as understanding potentials of their uses and applications.
A5	Skills of understanding the microorganisms' role as pathogenic agents and as biotechnological tools.
B1	Analysis skills to understand biological problems in connection with the Molecular and Cellular Biology and Genetics.

B2	Skills of decision making for the problem solving: that are able to apply theoretical knowledges and practical acquired in the formulation of biological problems and the looking for solutions.
B3	Skills of management of the information: that are able to gather and to understand relevant information and results, obtaining conclusions and to prepare reasoned reports on scientific and biotechnological questions
B4	Organization and work planning skills: that are able to manage the use of the time as well as available resources and to organize the work in the laboratory.
B5	Correct oral and written communication on scientific topics in the native language and at least in another International diffusion language.
B7	Personal progress skills : that are able to learn from freelance way, adapting to new situations, developing necessary qualities as the creativity, skills of leadership, motivation for the excellence and the quality.
B8	Critical reasoning skills and ethical commitment with the society: sensitivity in front of bioethical problems and to the ones related to the natural resource conservation
B9	Skills of preparation, show and defense of a work.
C3	Using ICT in working contexts and lifelong learning.
C4	Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective.
C5	Understanding the importanceof entrepreneurial culture and the useful means for enterprising people.
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.
C7	Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.
C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Understand the microbial cooperative behavior and the interactions of micro-organisms with other living beings at the molecular level	AR5	BR5 BR7 BR8	CC6 CC7 CC8
Handle the techniques and understand the molecular basis of the fight against infections and resistance mechanisms	AR1 AR2 AR5	BR1	CC4 CC7 CC8
Apply the molecular knowledge to understanding and solving problems		BR1 BR2 BR3 BR4 BR7 BR8 BR9	CC3 CC4 CC5 CC6 CC7 CC8

Contents	
Topic	Sub-topic
Microbial cooperative behaviour	-Molecular basis for the cooperation -Practical implications
Microbial interactions	-Positive and negative interactions -Molecular basis of the interactions with other microorganisms, plants or animals
Mechanisms of resistance to antimicrobial agents	-Enzymes degrading antimicrobial agents -Expulsion pumps -Modification of targets -Regulation of porins
New anti-infectious therapies	-Phagotherapy against multi-resistant bacteria -Antitolerants

Bacterial tolerance and persistence	-Phenotypic studies -Molecular mechanisms
Practical study of different aspects involved in the resistance to antimicrobial agents	-PCR of involved genes -Gene clonning -Protein expression -Preparation of knock-out mutants -Studies of the regulation of the mechanisms of resistance through RNA analysis

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Short answer questions	B1 B2 B5	2	0	2
Guest lecture / keynote speech	A5 C4 C5 C8	14	35	49
Seminar	A2 B3 B7 B8 B9 C3	1	7	8
Laboratory practice	A1 B4 C6 C7	7	7	14
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
Short answer questions	Written test that will assess the grade of knowledge and understanding achieved by the student.
Guest lecture / keynote speech	Exposure by the teaching staff of the theoretical basis of the subject
Seminar	Elaboración dun informe a partir de información aportada polo profesorado, e defensa presencial de dito informe. Poderá ser individual ou en grupo.
Laboratory practice	Case study in the research laboratory of dfferent aspects involved in resistance to antimicrobial agents carried out by the students.

Personalized attention	
Methodologies	Description
Guest lecture / keynote speech Laboratory practice Seminar	During the development of the subject will be addressed in the needs of the student and consultations relating to the subject matter, providing you the necessary support, both in person or through email.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Guest lecture / keynote speech	A5 C4 C5 C8	Avalíase pola proba de resposta breve	0
Laboratory practice	A1 B4 C6 C7	Continuous assessment of practices	20
Short answer questions	B1 B2 B5	Written test on the knowledge acquired during the course, both in its theoretical and practical aspects	70
Seminar	A2 B3 B7 B8 B9 C3	Valorarase a capacidade crítica e de síntese do informe presentado, además da fluidez na lenguaxe científica na exposición e defensa do mesmo	10

Assessment comments

Attendance is mandatory laboratory practices to be evaluated. To account for the final grade in the value obtained in sections of seminars, practical and oral presentation, the student must have passed the short answer questions, corresponding to the theory of the subject. The students that not pass the course at the first choice, must overcome the unapproved part at the second chance. In the case of very exceptional circumstances and properly justified, the Professor could exempt total or partially to the student in that concur of any process of evaluation. This Student would have to subjected it a particular examination that will not leave doubts envelope his level of knowledge, competitions, skills and habilities. "NO PRESENTADO" mark is obtained only when the student has not been submitted to the mixed test. If the number of "Matrículas de Honor" (Distinction Award) that can be granted in the first option, you will not be granted in the second chance even when the maximum score is reached.

Sources of information	
Basic	- Gerischer (Ed) (2008). Acinetobacter Molecular Biology. Caister Academic Press - Madigan, Martinko, Bender, Buckley y Stahl (2015). Brock. Biología de los microorganismos. 14ª edición. Pearson Educación, S.A. - Lederberg & Schaeter (Eds) (2009). Encyclopedia of Microbiology. 3rd edition. Academic Press
Complementary	- Otero, Muñoz, Bernárdez & Fábregas (2005). "Quorum sensing": El lenguaje de las bacterias. Zaragoza. Acribia - Maragakis & Perl (2008). Acinetobacter baumannii: epidemiology, antimicrobial resistance, and treatment options. Clin Infect Dis 46(8): 1254-63 - Vila, Martí & Sánchez-Céspedes (2007). Porins, efflux pumps and multidrug resistance in Acinetobacter baumannii. J Antimicrob Chemother 59(6): 1210-5 - Gootz (2010). The global problem of antibiotic resistance. Crit Rev Inmunol 30(1): 79-93 - Pachón & Vila (2009). Treatment of multiresistant Acinetobacter baumannii infections. Curr Opin Invest Drugs 10(2): 150-6 It is noted here several revisions directly related to the content of the subject. In addition, during the development of the subject the student is given another bibliography, depending on the scheduled seminars and any other developments that arose.It is noted here several revisions directly related to the content of the subject. In addition, during the development of the subject the student is given another bibliography, depending on the scheduled seminars and any other developments that arose.

Recommendations
Subjects that it is recommended to have taken before
Regulation of gene expression/610441006 Molecular Plant-Pathogen Interaction Mechanisms/610441018
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Cellular Techniques/610441001 Molecular Techniques/610441002 Advanced Cellular Biology/610441003 Cell Signaling/610441004 Genetic Variation Mechanisms/610441005 Regulation of gene expression/610441006
Other comments
Of all the subjects that it recommends to have studied previously, compulsory all of them of the master's degree, the technical subjects are considered to be fundamental. The student has access to teacher presentations via Moodle, being these presentations only a guide for the study but never will be the total content of the matter.

(*)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.