Teaching Guide				
Identifying Data				2016/17
Subject (*)	Microbioloxía Molecular		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	Optativa	3
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía Celular e Molecular			
Coordinador	Cid Blanco, Angeles	E-mail	angeles.cid@udc.es	
Lecturers	Bou Arévalo, Germán Cid Blanco, Angeles Poza Domínguez, Margarita Tomás Carmona, Mª del Mar	E-mail	GermanBou@canalejo.org angeles.cid@udc.es margarita.poza.dominguez@correo.udc.es MA.del.Mar.Tomas.Carmona@sergas.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)			

Study programme competences / results	
Code	Study programme competences / results
A1	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.
A2	Skills of working in a sure way in the laboratories knowing operation handbooks and actions to avoid incidents of risk.
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	Skills of Using basic tools of the information technologies and communications (ICT) necessary to the exercise of his profession and for the apprenticeship over his life.
C4	Skills of take place for the exercise of an open citizenship, highbrow, critic, committed, democratic and solidary, able to analyze the reality, diagnosing problems, formulating and to implement solutions based on the knowledge and oriented to common good.
C5	Understanding the importance of the enterprising culture and to know means within reach of enterprising people.
C6	Considering critically the knowledge, technologies and the available information to solve problems with which should face.
C7	Assuming as a professional and citizen the importance of the apprenticeship over the life.
C8	Considering the importance that the investigation has, the innovation and the technological development in the socioeconomic advance and cultural of the 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
Biotechnological applications	-Practical aplications of the microbial molecular interactions
Mechanisms of resistance to antimicrobial agents	-Enzymes degrading antimicrobial agents -Expulsion pumps -Modification of targets -Regulation of porins
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
Laboratory practice	A2 B4 C7 C6	7	7	14
Seminar	A1 B3 B7 B8 B9 C3	1	7	8
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
Laboratory practice	Case study in the research laboratory of dfferent aspects involved in resistance to antimicrobial agents carried out by the students.
Seminar	Working Group that will discuss certain aspects related to the subject, elaborating final conclusions

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	A2 B4 C7 C6	Continuous assessment of practices	25
Seminar	A1 B3 B7 B8 B9 C3	Active participation in the programmed seminars	5
Short answer questions	B1 B2 B5	Written test on the knowledge acquired during the course, both in its theoretical and practical aspects	70

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, Dunlap & Clark (2009). Brock. Biología de los microorganismos. 12ª edición. Madrid. 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 Señálanse varias revisions relacionadas directamente co contido da materia. Ademais, durante o desenvolvemento da materia proporcionares ó alumno outra bibliografía que dependerá dos seminarios programados e de calquera novidade que xurdise.

Recommendations
Subjects that it is recommended to have taken before
Regulación da expresión xénica/610441006 Mecanismos Moleculares da Interacción Planta-patóxeno/610441018
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Técnicas Celulares/610441001 Técnicas Moleculares/610441002 Bioloxía Celular Avanzada/610441003 Señalización Celular/610441004 Mecanismos de xeración da variación xenética/610441005 Regulación da expresión xénica/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.