



## Teaching Guide

Identifying Data					2014/15
Subject (*)	Microbioloxía e biotecnoloxía ambiental	Code	610G02018		
Study programme	Grao en Bioloxía				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	2nd four-month period	Fourth	Optativa	6	
Language	Spanish				
Prerequisites					
Department	Bioloxía Celular e Molecular				
Coordinador	Cid Blanco, Angeles	E-mail	angeles.cid@udc.es		
Lecturers	Cid Blanco, Angeles Rioboo Blanco, Carmen	E-mail	angeles.cid@udc.es carmen.rioboo@udc.es		
Web					
General description	Comprender o papel que desenvolven os microorganismos nos ecosistemas, a resultas da suas capacidades metabólicas e dos seus patróns de comportamento. A partires deste coñecemento previo, farase unha aproximación a cómo se poden empregar as devanditas capacidades microbianas para o beneficio da sociedade.				

## Study programme competences

Code	Study programme competences
A1	Recoñecer distintos niveis de organización nos sistemas vivos.
A2	Identificar organismos.
A4	Obter, manexar, conservar e observar espécimes.
A9	Identificar e utilizar bioindicadores.
A10	Avaliar actividades metabólicas.
A13	Realizar o illamento e cultivo de microorganismos e virus.
A14	Desenvolver e aplicar produtos e procesos de microorganismos.
A15	Deseñar e aplicar procesos biotecnolóxicos.
A26	Deseñar experimentos, obter información e interpretar os resultados.
A30	Manexar adecuadamente instrumentación científica.
A31	Desenvolverse con seguridade nun laboratorio.
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.
B6	Organizar e planificar o traballo.
B7	Comunicarse de maneira efectiva nunha contorna de traballo.
B8	Sintetizar a información.
B9	Formarse unha opinión propia.
B10	Exercer a crítica científica.
B11	Debater en público.
B12	Adaptarse a novas situacións.
B13	Comportarse con ética e responsabilidade social como cidadán e como profesional.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C4	Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.



Learning outcomes			
Subject competencies (Learning outcomes)	Study programme competences		
To know the role of microorganisms in natural environments	A1	B2	C1
	A2	B3	C4
	A4	B4	C6
	A13	B5	C8
		B6	
		B7	
		B8	
		B9	
		B10	
		B11	
		B12	
		B13	
	To apply the metabolic capabilities of micro-organisms to solve environmental problems	A2	B2
A4		B3	C4
A9		B4	C6
A10		B5	C8
A13		B6	
A14		B7	
A15		B8	
A26		B9	
A30		B10	
A31		B11	
		B12	
		B13	

Contents	
Topic	Sub-topic
INTRODUCTION TO THE SUBJECT	-Environmental Microbiology: an historical overview
MICROBIAL BEHAVIOUR	-Cellular behaviour and environment -Microbial cooperative behaviour
MICROBIAL METABOLISM AND BIOGEOCHEMICAL CYCLES	-Microbial activity in the carbon cycle -Microbial activity in the nitrogen and sulfur cycles -Microbial conversions of other chemical elements
MICROBIAL INTERACTIONS	-Interactions between microorganisms and plants -Non-pathogenic interactions between microorganisms and animals
BIODEGRADATION, RECYCLING AND ENVIRONMENTAL BIOTECHNOLOGY	-Extremophiles -Microbial biodeterioration -Water treatment, depuration and control -Urban solid waste treatment -Bioremediation -Microbiological control of pests
PRACTICES	-Microbial sampling and detection from natural environments -Determination of microbial activity in natural environments -Study of the microbial behaviour: quórum sensing and biofilms

**Planning**



Methodologies / tests	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	24	48	72
Seminar	8	32	40
Laboratory practice	15	9	24
Oral presentation	2	3	5
Mixed objective/subjective test	3	0	3
Personalized attention	6	0	6

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

Methodologies	
Methodologies	Description
Guest lecture / keynote speech	Exhibition by the teaching staff of the theoretical bases of the subject
Seminar	Realization of seminars, which may be theoretical and/or practical, related to the contents of the subject
Laboratory practice	Laboratory practices are mandatory attendance. In them will be addressed, from the experimental point of view, points in the session and keynote in the seminars.
Oral presentation	Each student will be required to develop and perform at least one oral presentation (10-15 minutes) of a scientific work related to the agenda of the matter, and that will determine the matter seminars.
Mixed objective/subjective test	Written test in which will value the degree of knowledge and understanding achieved by the student.

Personalized attention	
Methodologies	Description
Seminar Laboratory practice Oral presentation	During the development of the subject will be met the needs and the student queries related to the matter, providing the guidance and support that are needed, both in person and on-line. Within the personalized attention you can include mentoring requested by the student for the preparation of examinations, as well as the subsequent revision of the same, and the preparation of seminars and oral presentation provided for in the subject.

Assessment		
Methodologies	Description	Qualification
Mixed objective/subjective test	An examination in writing is made to assess the level of knowledge achieved.	60
Guest lecture / keynote speech	Computed on the mixed objective/subjective test	0
Seminar	The student must prepare a critical review of an original or published investigation study. Critical and synthesis abilities will have regard for the final mark.	15
Laboratory practice	Laboratory practices must be carried out by the student in the fixed dates. Continuous evaluation and a final test will be done to assess the level of knowledge of the student.	15
Oral presentation	At the end of the seminar sessions the students must carried out an oral presentation to show a scientific work. This scientific work could be original when the showed data have been obtained during the seminar or practical sessions. The fluency of the scientific language of the oral presentation and the answering ability will have regard for the final mark.	10

Assessment comments
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Attendance is mandatory laboratory practices to be evaluated, as well as having delivered and / or filled in a timely manner the tasks identified as mandatory.

To account for the final grade in the value obtained in sections of seminars, practical and oral presentation, the student must have passed the mixed test, corresponding to the theory of the subject.

The students that&nbsp;not pass the course at the first choice, must overcome the unapproved part at the second chance .

"NO PRESENTADO" mark&nbsp;is obtained only&nbsp;when the student&nbsp;has not&nbsp;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

<b>Basic</b>	<ul style="list-style-type: none"><li>- Castillo y colaboradores (2005). Biotecnología ambiental. Editorial Tébar</li><li>- Marín, Sanz y Amils (2005). Biotecnología y medioambiente. Editorial Ephemera</li><li>- Madigan, Martinko, Dunlap y Clark (2009). Brock Biología de los microorganismos. Pearson Educación</li><li>- Atlas y Bartha (2002). Ecología microbiana y Microbiología ambiental. Pearson Educación S.A.</li><li>- Willey, Sherwood y Woolverton (2009). Microbiología de Prescott, Harley y Klein. 7ª ed.. McGraw-Hill</li></ul>
<b>Complementary</b>	<ul style="list-style-type: none"><li>- <a href="http://microbewiki.kenyon.edu/index.php/MicrobeWiki">http://microbewiki.kenyon.edu/index.php/MicrobeWiki</a> ().</li><li>- <a href="http://microbiologyplace.com">http://microbiologyplace.com</a> ().</li><li>- Winans y Bassler (2008). Chemical Communication among Bacteria. ASM Press</li><li>- Maier, Pepper y Gerba (2009). Environmental Microbiology 2nd ed. Academic Press</li></ul>

### Recommendations

#### Subjects that it is recommended to have taken before

#### Subjects that are recommended to be taken simultaneously

#### Subjects that continue the syllabus

Bioquímica: Bioquímica I/610G02011  
Bioquímica: Bioquímica II/610G02012  
Microbiología/610G02015  
Microbiología aplicada e control microbiológico/610G02016  
Técnicas en Microbiología/610G02017

#### Other comments

(\* )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.