



Teaching Guide

Identifying Data					2014/15
Subject (*)	Técnicas en Microbioloxía	Code	610G02017		
Study programme	Grao en Bioloxía				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	1st four-month period	Third	Obligatoria	6	
Language	Spanish				
Prerequisites					
Department	Bioloxía Celular e Molecular				
Coordinador	Torres Vaamonde, Jose Enrique	E-mail	enrique.torres@udc.es		
Lecturers	Abalde Alonso, Julio Ernesto Cid Blanco, Angeles Fidalgo Paredes, Pablo Rioboo Blanco, Carmen Torres Vaamonde, Jose Enrique	E-mail	julio.abalde@udc.es angeles.cid@udc.es pablo.fidalgo@udc.es carmen.rioboo@udc.es enrique.torres@udc.es		
Web					
General description	Aprendizaxe das técnicas básicas dun laboratorio de Microbioloxía, así como as súas potenciais aplicacións no campo do control de calidade microbiolóxica e a investigación.				

Study programme competences

Code	Study programme competences
A1	Recoñecer distintos niveis de organización nos sistemas vivos.
A2	Identificar organismos.
A5	Analizar e caracterizar mostras de orixe humana.
A9	Identificar e utilizar bioindicadores.
A11	Identificar e analizar material de orixe biolóxica e as súas anomalías.
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.
A20	Muestrear, caracterizar e manexar poboacións e comunidades.
A21	Deseñar modelos de procesos biolóxicos.
A25	Desenvolver e aplicar técnicas de biocontrol.
A26	Deseñar experimentos, obter información e interpretar os resultados.
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.
B6	Organizar e planificar o traballo.
B7	Comunicarse de maneira efectiva nunha contorna de traballo.
B8	Sintetizar a información.
B10	Exercer a crítica científica.
B11	Debater en público.
B12	Adaptarse a novas situacións.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.



C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben afrontarse.
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		
Fluid handling of the basic techniques of microbiology laboratory and their potential applications in industry and research.	A1 A2 A5 A9 A11 A13 A14 A15 A20 A21 A25 A26 A27 A29 A30 A31	B2 B3 B4 B5 B6 B7 B8 B10 B11	C3 C6 C8
Understanding and correct use of scientific terminology.		B1 B7 B8 B10	C1
Ability to relate concepts and practical application thereof.		B1 B6 B8 B10 B12	C1 C3
Capacity of synthesis, processing and presentation of results, as well as the preparation of technical reports.		B1 B6 B7 B8	C1 C3

Contents	
Topic	Sub-topic
I. Methods for detection and quantification of microorganisms	1. Sampling 2. Processing of samples 3. Methods of enrichment, isolation and culture 4. Methods of counting
II. Classification and identification of prokaryotes	1. Phenotypic methods 2. Genotypic methods
III. Measures of biomass and microbial metabolic activity	1. Estimates of the total microbial biomass 2. Specific determination of biomass 3. Measures of microbial activity



PRACTICES	<ol style="list-style-type: none"> 1. Methods of counting and estimating biomass and microbial activity 2. Techniques for determining the microbiological quality of food 3. Rapid bacterial identification techniques 4. Microbiological water analysis 5. Genotypic methods for analysis of microorganisms
SEMINARS	<ol style="list-style-type: none"> 1. Reporting of results 2. Conducting case studies

Planning			
Methodologies / tests	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	8	16	24
Laboratory practice	45	45	90
Seminar	4	20	24
Case study	0	5	5
Mixed objective/subjective test	2	0	2
Personalized attention	5	0	5

(*)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	Exposition by teachers in which the theoretical program of the subject will be developed.
Laboratory practice	Students will conduct mandatory laboratory practices, which will be in group. The student will be introduced in the use of different techniques of analysis and study of microorganisms.
Seminar	Works in small groups in which the results previously obtained in the laboratory practices will be presented in a reasoned manner. In addition, microbiological analysis for different practical cases will be proposed and scientific criticism should be exercised.
Case study	The student will be proposed with at least one practical case in which he will reasonably indicate the actions to be taken from the point of view of a microbiologist, to meet the demand required in this case.
Mixed objective/subjective test	Test written in which the degree of knowledge and understanding achieved by the students in all aspects included in the subject will be assessed.

Personalized attention	
Methodologies	Description
Seminar Guest lecture / keynote speech Laboratory practice Case study	During the development of the subject, requirements and queries of the students regarding the subject will be addressed by providing the necessary guidance and support, both in person as non-presential.

Assessment		
Methodologies	Description	Qualification
Seminar	Evaluation of the tasks carried out during the seminars. It will be required by the students, in person and in the classroom, the results that have been obtained in the performing of laboratory practices.	10
Guest lecture / keynote speech	Assessed through the mixed test.	0
Laboratory practice	Mandatory attendance and evaluation of student work during the development of practices. In mixed test, questions directly related to practical issues will be also proposed.	10



Mixed objective/subjective test	Test written about the knowledge acquired in the keynote sessions, the laboratory practices and in the seminars.	70
Case study	The student must resolve a practical case that will be proposed during the seminars.	10

Assessment comments

To pass the course, in any of the diets to which the student may go, the student must have obtained a 5 out of 10 in the "mixed test", performing all tasks that are considered mandatory, and obtain a minimum score of 1 point on a maximum 3.

In the case of not passing the subject in a first option, in the second option, the student must pass only the part that was not passed.

For a student to be considered "NOT PRESENT", he must have the following requirements: not site the examination (the mixed-test) and not attend half of the practice sessions.

If the number of "with Honours" that may be granted is exhausted in the first option, none will be granted in the second option, even though the maximum note is obtained.

Sources of information

Basic	<ul style="list-style-type: none"> - MADIGAN & MARTINKO (2009). Brock. Biología de microorganismos. 12ª ed.. Prentice Hall - WILEY, SHERWOOD & WOOLVERTON (2009). Microbiología de Prescott, Harley y Klein. 7ª ed.. McGraw Hill
Complementary	<ul style="list-style-type: none"> - COLLINS, LYNE & GRANGE (1995). Collins and Lyne's Microbiological Methods. 7th ed.. Butterworth-Heinemann Ltd. - SINGER (2001). Experiments in Applied Microbiology. Academic Press - HUDSON & SHERWOOD (1997). Explorations in Microbiology. Prentice Hall - GAMAZO, LÓPEZ-GOÑI & DÍAZ (2005). Manual Práctico de Microbiología. 3ª ed.. Editorial Masson - APHA, AWWA, WPCF (1992). Métodos normalizados para el análisis de aguas potables y residuales. Ediciones Díaz de Santos, S.A. - PASCUAL ANDERSON & CALDERON PASCUAL (2000). Microbiología alimentaria. Metodología Analítica para alimentos y bebidas. Ediciones Díaz de Santos S.A.

Recommendations

Subjects that it is recommended to have taken before

Microbioloxía e biotecnoloxía ambiental/610G02018

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Microbioloxía/610G02015

Microbioloxía aplicada e control microbiolóxico/610G02016

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.