Teaching Guide				
Identifying Data				2014/15
Subject (*)	Microbioloxía aplicada e control microbiolóxico		Code	610G02016
Study programme	Grao en Bioloxía			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatoria	6
Language	Spanish			
Prerequisites				
Department	Bioloxía Celular e Molecular			
Coordinador	Torres Vaamonde, Jose Enrique	E-mail	enrique.torres@udc.es	
Lecturers	Herrero Lopez, Maria Concepcion Rioboo Blanco, Carmen Torres Vaamonde, Jose Enrique	E-mail	concepcion.herrero@udc.es carmen.rioboo@udc.es enrique.torres@udc.es	
Web				
General description	Asignatura na que se tratan os conceptos, procedementos e métodos do control microbiolóxico, a interacción normal e patóxena dos microorganismos con animais, os coñecementos básicos da microbioloxía ambiental e a aplicación dos microorganismos nos procesos industriais a grande escala.			

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 especímenes.
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 biotecnológicos.
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.
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.

C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
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.
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.
C5	Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
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		
Ability to develop professional activities in the field of Applied Microbiology.	A14 A15 A25 A26	B2 B8	C3
Identify, formulate and solve microbiological problems in the health, business and environmental issues.	A14 A15	B2 B8	C3
Mastering the microbiology of food, air and techniques to carry out microbiological control.	A14 A25	B2	C1 C3 C6
Professional development in technical services in the healthcare sector, animal production, agriculture or food.	A14 A15 A21 A25 A26 A27 A30 A31	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13	C3 C4 C5 C6 C7 C8
Know and use methods and techniques used in microbiological control.	A1 A2 A4 A9 A13 A14 A15 A25 A27 A30 A31	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13	C2 C3 C4 C5 C6 C7 C8

Knowing the current state of knowledge on the microbiological aspects of science.	A1 A2 A9 A11 A13 A14 A25 A29 A30 A31	B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13	C3 C4 C5 C6 C7 C8

Contents	
Topic	**Sub-topic**
UNIT 1. - CONCEPTS AND MICROBIAL CONTROL PROCEDURES	ITEM 1. CONTROL BY PHYSICAL AGENTS ITEM 2. CONTROL BY CHEMICAL AGENTS ITEM 3. ANTIMICROBIAL CHEMOTHERAPEUTICS
UNIT 2. - METHODS FOR THE MICROBIOLOGICAL CONTROL OF QUALITY	ITEM 4. IMPORTANCE OF THE MICROBIOLOGICAL CONTROL OF QUALITY: MICROBIOLOGICAL CRITERIA ITEM 5. SAMPLING: MICROBIOLOGICAL SAMPLING PROGRAMMES ITEM 6. PROCEDURES OF MICROBIOLOGICAL ANALYSIS OF COMMERCIAL PRODUCTS ITEM 7. MICROBIOLOGICAL INDICATORS OF QUALITY AND SAFETY
UNIT 3. - MICROORGANISMS AND DISEASE	ITEM 8. NORMAL MICROBIOTA. MICROBIAL PATHOGENICITY ITEM 9. MICROBIAL INTERACTION WITH THE HOST DEFENSES ITEM 10. IMMUNOPATHOLOGY AND IMMUNOLOGICAL THERAPEUTICS ITEM 11. IMMUNOLOGICAL TECHNIQUES FOR THE DETECTION AND IDENTIFICATION OF MICROORGANISMS
UNIT 4. - ENVIRONMENTAL MICROBIOLOGY	ITEM 12. MICROORGANISMS AS COMPONENTS OF ECOSYSTEMS. BIOGEOCHEMICAL CYCLES ITEM 13. MICROBIAL INTERACTIONS ITEM 14. MICROORGANISMS IN NATURAL ENVIRONMENTS

UNIT 5. - USE AND INDUSTRIAL MICROORGANISMS APPLICATIONS	ITEM 15. INDUSTRIAL MICROORGANISMS AND FORMATION OF PRODUCTS ITEM 16. GENETIC ENGINEERING: PRINCIPLES AND APPLICATIONS ITEM 17. INDUSTRIAL PROCESSES: TYPES OF BIOREACTORS ITEM 18. GROWTH OF MICROORGANISMS IN INDUSTRIAL SYSTEMS
UNIT 6. - INDUSTRIAL PRODUCTS USING MICROORGANISMS	ITEM 19. ALCOHOLIC FERMENTATION ITEM 20. LACTIC FERMENTATION ITEM 21. PRODUCTION OF ORGANIC ACIDS, ANTIBIOTICS, VITAMINS AND ENZYMES
LABORATORY PRACTICES	Practice 1. Alcoholic fermentation Practice 2. Lactic acid fermentation Practice 3. Obtaining of microbial metabolites of interest. Practice 4. Determination of antibiotic susceptibility of bacteria Practice 5. Control of microorganisms by physical agents Practice 6. Experimental determination of decimal reduction time: the value of D

Planning			
Methodologies / tests	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	30	67.5	97.5
Laboratory practice	15	15	30
Problem solving	6	9	15
Mixed objective/subjective test	2.5	0	2.5
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	The exposition of the theoretical content of the subject will be carried out by teachers. In the exposition, different resources based on information technologies and on the use of web-based resources will be used.
Laboratory practice	Practices are of compulsory attendance. In the practice sessions, practical examples of most of the processes that have been shown in the keynote sessions will be carried out.
Problem solving	The resolution of problems relating to different aspects of the content of the subject will take place in seminars. The knowledge acquired in solving of the problems will be valued in the mixed test.
Mixed objective/subjective test	The contents explained in keynote sessions and in the resolution of problems will be assessed through a written test.

Personalized attention	
Methodologies	Description

Guest lecture / keynote speech Mixed objective/subjective test Laboratory practice Problem solving	Tutorials are included within the personalized attention for both theoretical sessions (Keynotes sessions) as for seminars and laboratory practices. Also, the theory and practical test preparation sessions can be included. Specific times of personalized attention for the review of the tests of theory, practices and other aspects that are evaluated in the mixed event will be reserved.

Assessment		
Methodologies	Description	Qualification
Guest lecture / keynote speech	Assessed through the mixed-test.	0
Mixed objective/subjective test	Written test of knowledge acquired in the master classes and seminars.	70
Laboratory practice	Mandatory attendance. Continuous assessment during the development of the same (5%). Exam (15%).	20
Problem solving	There will be a continuous assessment of the problem solving and questionnaires, which will be assessed and will be 10% of the final grade. In addition, the knowledge acquired in solving problems will be assessed in the mixed test.	10

Assessment comments
Assistance to the problem solving sessions and laboratory practices is mandatory. The student must pass both the practical and the mixed test to pass the subject. To pass the practices, in addition to the assistance, it is imperative to pass the corresponding test. For continuous assessment, in regard to the resolution of problems, each student must submit the corresponding problems solved prior to attending to each session and as indicated by the teacher. Finally, it should go to the corresponding session. Mixed test:: will consist of two parts, theoretical (50%) and problem solving (20%). To pass the subject, must be passed each of the evaluated parts: theory, practice, and problem solving. The attendance to seminars and laboratory practices is mandatory. For a student to be considered as "NOT PRESENT" should not have made the mixed-test. In the case of not pass the subject in the first option, in the second chance, it must only pass the not passed part. If it is the theory, repeating the corresponding part of the mixed test, the same in the case of problem solving. If they are the practices, repeating the test. In the case that several students choose to obtain "honors", and could not be granted all, only shall be granted to those students who obtained the highest assessment at the first opportunity.

Sources of information	
Basic	
Complementary	

Recommendations
Subjects that it is recommended to have taken before

Técnicas en Microbioloxía/610G02017 Microbioloxía e biotecnoloxía ambiental/610G02018
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Microbioloxía/610G02015
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.