Teaching Guide					
Identifying Data					2021/22
Subject (*)	Microbiology			Code	610G02015
Study programme	Grao en Bioloxía				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	Second		Obligatory	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Bioloxía				
Coordinador	Herrero Lopez, Maria Concepcion		E-mail	concepcion.herrero@udc.es	
Lecturers	Cid Blanco, Angeles Fidalgo Paredes, Pablo Herrero Lopez, Maria Concepcion Poza Domínguez, Margarita		E-mail	angeles.cid@udc.es pablo.fidalgo@udc.es concepcion.herrero@udc.es margarita.poza.dominguez@correo.udc.es	
Web					
General description	Compulsory subject of the Degree in Biology. It introduces students to the basic concepts of Microbiology, both theoretical and practical: structure of microorganisms; bacterial physiology; introduction to Virology; microbial genetics; phylogeny and systematics of microorganisms. It is the basis for other subjects in the same field, either compulsory or optional. It is complemented with other subjects of the Degree, such as Biochemistry, Genetics, Ecology, etc.				

Contingency plan	In the case of space capacity problems in the spaces designated for presential activities, additional spaces will be reserved for the students to follow the activities through the TEAMS platform. In the case of practical activities, the groups will be divided to adapt to the capacity of the laboratory. In the case of unexpected non-attendance: 1. Modifications to the contents None 2. Methodologies *Teaching methodologies that are maintained None *Teaching methodologies that are modified Master class and seminars: telematic teaching by means of Teams Laboratory practices: if the practices cannot be carried out in person, they will be replaced by telematic alternatives related to the corresponding subject matter. 3. Mechanisms for personalised attention to students Microsoft Teams: Personal and group attention (video, audio or chat) when students ask questions; also on demand from teachers. Moodle: Document repository and help in teaching, also for notifications and communication with students through the forum. Email: Personalized and group attention to questions required by students, as well as notifications from teachers Telephone: Two-way personalized attention required by both participants. 4. Modifications in the evaluation *Evaluation observations: All attendance tests are now telematic and the percentages are amnestied 5. Modifications to the bibliography or webgraphy Not applicable Translated with www.DeepL.com/Translator (free version)

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.
A13	Realizar o illamento e cultivo de microorganismos e virus.
A15	Deseñar e aplicar procesos biotecnológicos.
A21	Deseñar modelos de procesos biolóxicos.
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.
B12	Adaptarse a novas situacións.

Learning outcomes			
Learning outcomes	Study programme competences		
Coñecemento teórico e práctico dos microorganismos nos seus aspectos básicos Coñecementos básicos sobre a estrutura e fisioloxía dos microorganismos, así como as bases metodolóxicas para o estudo dos mesmos	A1 A2 A4 A13 A15 A21 A29 A30 A31	B1 B2 B3 B4 B5 B6 B7 B8 B9 B12	

Contents	
Topic	Sub-topic
Section I: : Introduction to Microbiology	1.- Members of the Microbial World. History of Microbiology. Importance of the microorganisms 2.- Microbial diversity. The Three Domais: Bacteria, Archaea and Eukarya. Viruses. The species concept in Microbiology. Nomenclature
SECTION II: Prokaryotic cell structure	3.- Cell shape and size. Bacterial cell wall 4.- Bacterial protoplast 5.- Cell surface structures in bacteria 6.- Bacterial endospores 7.- Archaeal cell morphology and structure
SECTION III: Microbial nutrition, metabolism and growth	8.- Nutrition and culture of microorganisms. Nutritional types. Nutrient sources. Culture media. 9.- Essentials of microbial metabolism. Diversity of metabolic processes to obtain energy in microorganisms 10.- Energy utilization. Regulation 11.- Microbial growth: cell division and population growth. Measurement of microbial growth. 12.- Effect of environmental factors on microbial growth
SECTION IV: Virology	13.- Overview of Virology 14.-Bacterial viruses 15.- Animal viruses. Viruses and cancer. Antiviral chemotherapyl 16.- Plant viruses. Subviral entities
SECTION V: Microbial genetics	17.- Mutation 18.- Genetic elements in bacteria 19.- Gene transfer in bacteria and archaea: transformation, transduction and conjugation 20.- Introduction to genetic engeneerong

SECTION VI: Microbial evolution and systematics	21.- Microbial evolution 22.- Microbial systematics. Classification and identification 23.- Domain Archaea 24.- Domain Bacteria 25.- Eukaryotic microorganisms
LABORATORY PRACTICE	- Observation of microorganisms. Staining techniques - Preparation of culture media - Laboratory culture of microorganims. Obtention of pure cultures - Normal microbiota - Growth curve - Identification of microorganisms

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A1 A15 A21 A29 B1 B3 B6 B8 B9	30	75	105
Laboratory practice	A2 A4 A13 A29 A30 A31 B1 B2 B4 B5 B6 B12	15	7.5	22.5
Mixed objective/subjective test	A1 B1 B2 B3 B4 B8 B9	4	0	4
Seminar	B1 B2 B3 B4 B5 B6 B7 B8 B9	5	10	15
Personalized attention		3.5	0	3.5
(*)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	Lectures presented by the teaching staff concerning the theoretical bases of the subject
Laboratory practice	Compulsory attendance. They include experimental work related to theoretical concepts explained in guest lectures and seminars Students will be able to perform the basic processes and techniques used in Microbiology
Mixed objective/subjective test	The degree of knowledge and understanding achieved by the student will be assessed in a written exam
Seminar	Theoretical and/or practical seminars, related to the contents of the subject. They are conceived as a reinforcement of the topics covered in classes and laboratory to stimulate the continuous learning of the student. They will be assessed in the mixed test, but specific assessments can be set.

Personalized attention	
Methodologies	Description
Laboratory practice Seminar Mixed objective/subjective test	During the development of the subject, the teachers will take care of the needs and queries of the student related to the subject, providing the guidance and support required, both in person and on-line. Exam preparation sessions can be included, as well as the subsequent revision of the exam Part-time students must compulsorily attend laboratory practices, but are excused from attending other activities, although attendance to seminars is recommended.

Assessment			
Methodologies	Competencies	Description	Qualification
Laboratory practice	A2 A4 A13 A29 A30 A31 B1 B2 B4 B5 B6 B12	Compulsory attendance. Continuous assessment during the development of the lab work (5%). Exam (15%) If the student does not attend the lab practices, he/she will not pass the subject	20
Mixed objective/subjective test	A1 B1 B2 B3 B4 B8 B9	Written test about the knowledge acquired in the lectures and seminars. It will not exceed 80% of the total grade of the course	80

Assessment comments
Attendance to laboratory practices is compulsory to pass the subject. If the student does not attend the lab practices, he/she will not pass the subject; therefore they cannot do the mix test. To pass the subject, both practices and written exam must be passed. To pass the practices, besides the attendance, the student must pass a specific exam. "NO PRESENTADO" mark is obtained when the student do not do the written exam (mixed test). As a part of the continuous evaluation, the progression of the student throughout the semester will be taken into consideration with a maximum of 1 point. If the student does not pass the subject at the first opportunity, he/she must overcome the unapproved part at the second chance. If it is the theory, the student must repeat the mixed test. If practical exam is not passed, the student must repeat it. The highest grade "Matricula de Honor" will be mainly given to students that pass the subject in the "First Opportunity". And it will only be given in the so-called "second Opportunity" if there are still any available. In the case of very special and exceptional circumstances, adequately justified, the teacher can totally or partially exempts the student from part of the evaluation process. This student will then have to go through an examination process where he/she will need to clearly proof his/her level of knowledge, competence, capabilities and skills. Students with recognition of part-time dedication and academic dispensation of exemption from attendance both at the end of term and at the second opportunity will take into account, for the calculation of the overall grade, the grade obtained in the theory exam and the corresponding practical exam (see above format of both exams), representing 80% and 20% of the final grade, respectively.Fraudulent performance of the tests or assessment activities will directly imply, once verified, a grade of '0' in the subject at the corresponding opportunity.

Sources of information	
Basic	- MADIGAN, M., MARTINKO, J., BENDER, K., BUCKLEY, D. y STAHL, D. (2015). Brock Biología de los Microrganismos. 14ª ed. . Pearson Educación S.A. - Martín, A., Béjar, V., Gutiérrez, J.C., Llagostera, M y Quesada, E (2019). Microbiología Esencial. Panamericana - Tortora, G.J., Funke, B. R. and Case, C.L (2017). Introducción a la Microbiología 12ª Ed. Panamericana - WILLEY, J.M., SHERWOOD, L.M. and WOOLVERTON, C.J. (2009). Microbiología de Prescott, Harley y Klein. McGraw Hill - WILLEY, J.M., SHERWOOD, L.M. and WOOLVERTON, C.J. (2014). Prescott's Microbiology 9th ed. McGraw Hill
Complementary	

Recommendations

Subjects that it is recommended to have taken before
Chemistry/610G02001 Biology: Basic Levels of Organisation of Life I (Cells)/610G02007 Biochemistry I/610G02011
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Applied Microbiology and Microbiological Control/610G02016 Microbiology Techniques/610G02017 Microbiology and Environmental Biotechnology/610G02018
Other comments
Power point presentations uploaded in Moodle constitute a guide for the study of the themes, but in no case they include the overall contents of these themes Green Campus Programme Faculty of ScienceIn order to help achieve a sustainable environment and in accordance with point 6 of the "Environmental Declaration of the Faculty of Science (2020)", the works to be carried out in this subject:a. They will be requested mainly in virtual format and computer support.b. If they are made on paper:- No plastics will be used.- Double-sided printing shall be used.- Recycled paper shall be used.- Drafts shall be avoided.