



Teaching Guide						
Identifying Data				2022/23		
Subject (*)	Microbiology and Immunology		Code	610G04024		
Study programme	Grao en Nanociencia e Nanotecnoloxía					
Descriptors						
Cycle	Period	Year	Type	Credits		
Graduate	1st four-month period	Third	Obligatory	6		
Language	Spanish					
Teaching method	Face-to-face					
Prerequisites						
Department	Bioloxía					
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	This is an obligatory subject on the Degree in Nanoscience and Nanotechnology. It introduces students to the basic concepts of Microbiology and Immunology, both theoretical and practical: microbial diversity; structure of the prokaryotic cell; bacterial metabolism; microbial growth and control; introduction to Virology and Applied Microbiology; cellular and molecular components of the immune system; innate and adaptive immunology; immunopathology and applied immunology.					

Study programme competences / results	
Code	Study programme competences / results
A3	CE3 - Reconocer y analizar problemas físicos, químicos, matemáticos, biológicos en el ámbito de la Nanociencia y Nanotecnología, así como plantear respuestas o trabajos adecuados para su resolución, incluyendo el uso de fuentes bibliográficas.
A6	CE6 - Manipular instrumentación y material propios de laboratorios para ensayos físicos, químicos y biológicos en el estudio y análisis de fenómenos en la nanoescala.
A7	CE7 - Interpretar los datos obtenidos mediante medidas experimentales y simulaciones, incluyendo el uso de herramientas informáticas, identificar su significado y relacionarlos con las teorías químicas, físicas o biológicas apropiadas.
A8	CE8 - Aplicar las normas generales de seguridad y funcionamiento de un laboratorio y las normativas específicas para la manipulación de la instrumentación y de los productos y nanomateriales.
B3	CB3 - Que los estudiantes tengan la capacidad de reunir e interpretar datos relevantes (normalmente dentro de su área de estudio) para emitir juicios que incluyan una reflexión sobre temas relevantes de índole social, científica o ética
B4	CB4 - Que los estudiantes puedan transmitir información, ideas, problemas y soluciones a un público tanto especializado como no especializado
B6	CG1 - Aprender a aprender
B7	CG2 - Resolver problemas de forma efectiva.
B8	CG3 - Aplicar un pensamiento crítico, lógico y creativo.
C3	CT3 - Utilizar las herramientas básicas de las tecnologías de la información y las comunicaciones (TIC) necesarias para el ejercicio de su profesión y para el aprendizaje a lo largo de su vida
C6	CT6 - Adquirir habilidades para la vida y hábitos, rutinas y estilos de vida saludables
C7	CT7 - Desarrollar la capacidad de trabajar en equipos interdisciplinares o transdisciplinares, para ofrecer propuestas que contribuyan a un desarrollo sostenible ambiental, económico, político y social.
C8	CT8 - Valorar la importancia que tiene la investigación, la innovación y el desarrollo tecnológico en el avance socioeconómico y cultural de la sociedad

Learning outcomes



Learning outcomes	Study programme competences / results		
Theoretical and practical knowledge of the fundamental aspects of micro-organisms.	A3 A6 A7 A8	B3 B4 B6 B7	C3 C6 C7 C8 B8
Knowledge of the fundamentals of immunology.	A3 A6 A7 A8	B3 B4 B6 B7	C3 C6 C7 C8 B8

Contents	
Topic	Sub-topic
Section I: Introduction to Microbiology	1. Diversity of the Microbial World 2. Prokaryotic cell structure 3. Bacterial nutrition and metabolism 4. Growth and control of microorganisms 5. Basic principles of Virology 6. Applied Microbiology
Section II: Introduction to Immunology	7. Cellular and molecular components of the immune system 8. Innate and adaptive immunity 9. Immunopathology and applied immunology

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student's personal work hours	Total hours
Laboratory practice	A6 A7 A8 B7 C7	15	3	18
Seminar	B3 B4 B8 C3 C8	8	20	28
Mixed objective/subjective test	A3 B3 B4 B7	3	0	3
Guest lecture / keynote speech	A3 B4 B6 B8 C3 C6 C8	29	70	99
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
Laboratory practice	Laboratory practices are required to be attended by all students. They include an experimental approach to basic aspects of microbiology and immunology so that students are properly introduced to the basic processes and methodologies of these disciplines.
Seminar	Different types of seminars will be held in which the theoretical contents of the disciplines of this subject will be studied in depth. Some of them may be a consolidation of the contents dealt with in the lectures or in the practical sessions. All the seminars will try to stimulate the students' continuous work throughout the four-month period. They may be evaluated jointly with the master session in a mixed test, and also by means of a specific evaluation.
Mixed objective/subjective test	Written exam in which the degree of knowledge and understanding achieved by the students will be assessed.



Guest lecture / keynote speech	Presentation by the teaching staff of the theoretical bases of the subject.
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Personalized attention	
Methodologies	Description
Seminar	During the progress of the subject, students' needs and queries related to the subject will be attended to, providing them with the necessary guidance and support, both face-to-face and off-site.
Guest lecture / keynote speech	Personalised attention should include exam preparation sessions, as well as the subsequent revision of the exams.
Laboratory practice	Part-time students must be required to attend the laboratory practicals, but are excused from attending other face-to-face activities, although they are advised to attend the seminars

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Seminar	B3 B4 B8 C3 C8	Problem resolution to facilitate success in the written test. Guided work will be assessed by means of a rubric.	20
Guest lecture / keynote speech	A3 B4 B6 B8 C3 C6 C8	The degree of knowledge of the theoretical contents acquired in the lectures and seminars will be assessed by means of a written test.	70
Laboratory practice	A6 A7 A8 B7 C7	Attendance is required and assessment by means of a practical and/or written exam. Failure to take the practical exam will not allow the student from passing the course	10

Assessment comments	
It is required to attend the laboratory practicals in order to be evaluated, as well as to complete the obligatory tasks in the seminars in due time and form. Not completing the practicals will not allow the student to pass the subject, and the student who does not complete them will not be able to attend the mixed test (exam). In order to be considered as "NOT PRESENTED", the mixed exam must not have been taken. If the student does not pass the subject in the first option, he/she will only be able to take the mixed exam in the second opportunity. If the number of honours that can be awarded is reached in the first option, none will be awarded in the second option, even if the maximum mark is obtained. In the case of very exceptional, objectively justifiable and adequately justified circumstances, the teaching staff may totally or partially exempt a student from part of the evaluation process. This student would have to undergo a specific examination that leaves no doubt as to his/her level of knowledge, competences, skills and abilities.	
Students who are recognised as part-time or with academic dispensation will be evaluated on practice and theory.	
The fraudulent and proven performance of the tests or evaluation activities will directly imply the qualification of failing "0" in this subject in the corresponding opportunity.	

Sources of information	
Basic	- Madigan, Martinko, Bender, Buckley & Stahl (2015). Brock. Biología de los microorganismos. 14 ^a edición. Pearson Educación - Punt, Stranford, Jones & Owen (2018). Kuby. Inmunología. 8 ^a edición. McGraw Hill
Complementary	- http://www.semicrobiologia.org/ . . - http://www.asm.org/ . .

Recommendations	
Subjects that it is recommended to have taken before	
Structural Biochemistry/610G04019	
Cell Biology/610G04003	
Subjects that are recommended to be taken simultaneously	
Molecular and Metabolic Biochemistry/610G04023	
Subjects that continue the syllabus	



Nanotechnology in Pharmacy/610G04043
Nanotechnology in Food Industry/610G04044
Nanotechnology in Medicine/610G04037
Nanotechnology in Environmental Science/610G04038
Nanotoxicology/610G04032
Fundamentals of Biotechnology/610G04029

Other comments

The class presentations that are made available to students on the Virtual Campus are a guide for the study of the subjects, but in no case do they constitute the total content of the same. GREEN CAMPUS PROGRAMME-FACULTADE DE CIENCIAS In order to help achieve an immediate sustainable environment and comply with point 6 of the "Environmental Declaration of the Faculty of Science (2020)", the document work carried out on this subject: will be mostly requested in virtual format and computer support. If they are in paper format: no plastics shall be used; double-sided printing will be used; recycled paper shall be used; no drafts shall be used.

(*) 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.