



## 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<br>Rioboo Blanco, Carmen   | E-mail | angeles.cid@udc.es<br>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

| Code | Study programme competences   |
|------|---|
| 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 interdisciplinarios o transdisciplinarios, 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 |
|-------------------|-----------------------------|
|                   |                             |



|  |    |    |    |
|--|----|----|----|
| Theoretical and practical knowledge of the fundamental aspects of micro-organisms. | A3 | B3 | C3 |
|  | A6 | B4 | C6 |
|  | A7 | B6 | C7 |
|  | A8 | B7 | C8 |
|  |    | B8 |    |
| Knowledge of the fundamentals of immunology.                                       | A3 | B3 | C3 |
|  | A6 | B4 | C6 |
|  | A7 | B6 | C7 |
|  | A8 | B7 | C8 |
|  |    | B8 |    |

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

| Planning                        |                         |                      |                               |             |
|---------------------------------|-------------------------|----------------------|-------------------------------|-------------|
| Methodologies / tests           | Competencies            | Ordinary class hours | 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<br>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.<br>All the seminars will try to stimulate the students' continuous work throughout the four-month period.<br>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.  |

|                        |
|------------------------|
| 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.<br>Personalised attention should include exam preparation sessions, as well as the subsequent revision of the exams.<br>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 |
| Guest lecture /     |   |
| keynote speech      |   |
| Laboratory practice |   |

| Assessment                        |                         |   |               |
|-----------------------------------|-------------------------|---|---------------|
| Methodologies                     | Competencies            | Description   | Qualification |
| Seminar                           | B3 B4 B8 C3 C8          | Problem resolution to facilitate success in the written test.<br>Guided work will be assessed by means of a rubric.   | 20            |
| Guest lecture /<br>keynote speech | A3 B4 B6 B8 C3 C6<br>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.<br>Failure to take the practical exam will not allow the student from passing the course | 10            |

| Assessment comments   |
|---|
| <p>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.</p> <p>Students who are recognised as part-time or with academic dispensation will be evaluated on practice and theory.</p> <p>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.</p> |

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

| Recommendations   |
|---|
| <b>Subjects that it is recommended to have taken before</b>   |
| Structural Biochemistry/610G04019<br>Cell Biology/610G04003   |
| <b>Subjects that are recommended to be taken simultaneously</b>   |
| Molecular and Metabolic Biochemistry/610G04023  |
| <b>Subjects that continue the syllabus</b>  |
| Nanotechnology in Pharmacy/610G04043<br>Nanotechnology in Food Industry/610G04044<br>Nanotechnology in Medicine/610G04037<br>Nanotechnology in Environmental Science/610G04038<br>Nanotoxicology/610G04032<br>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.