



Teaching Guide

| Identifying Data | | | | | 2019/20 |
|----------------------------|---|---------------|--|----------------|---------|
| Subject (*) | Molecular Microbiology | Code | 610441010 | | |
| Study programme | Mestrado Universitario en Bioloxía Molecular , Celular e Xenética | | | | |
| Descriptors | | | | | |
| Cycle | Period | Year | Type | Credits | |
| Official Master's Degree | 2nd four-month period | First | Optional | 3 | |
| Language | Spanish | | | | |
| Teaching method | Face-to-face | | | | |
| Prerequisites | | | | | |
| Department | Bioloxía Departamento profesorado máster | | | | |
| Coordinador | Cid Blanco, Angeles | E-mail | angeles.cid@udc.es | | |
| Lecturers | Bou Arevalo, Germán Cid Blanco, Angeles Poza Domínguez, Margarita Tomas Carmona, Maria Del Mar | E-mail | angeles.cid@udc.es margarita.poza.dominguez@correo.udc.es maria.tomas@udc.es | | |
| Web | | | | | |
| General description | PENDIENTE DE INCLUIR POR LOS SERVICIOS DE GADU LOS SIGUIENTES PROFESORES DEL INIBIC: Germán Bou Arévalo (germanbou@canalejo.org) Margarita Poza Domínguez (Margarita.Poza.Dominguez@sergas.es) M ^º del Mar Tomas Carmona (ma.del.mar.tomas.carmona@sergas.es) | | | | |

Study programme competences / results

| Code | Study programme competences / results |
|------|--|
| A1 | Skills of using usual techniques and instruments in the cellular, biological and molecular research: that are able to use techniques and instruments as well as understanding potentials of their uses and applications. |
| A2 | Skills of working in a sure way in the laboratories knowing operation handbooks and actions to avoid incidents of risk. |
| A5 | Skills of understanding the microorganisms' role as pathogenic agents and as biotechnological tools. |
| B1 | Analysis skills to understand biological problems in connection with the Molecular and Cellular Biology and Genetics. |
| B2 | Skills of decision making for the problem solving: that are able to apply theoretical knowledges and practical acquired in the formulation of biological problems and the looking for solutions. |
| B3 | Skills of management of the information: that are able to gather and to understand relevant information and results, obtaining conclusions and to prepare reasoned reports on scientific and biotechnological questions |
| B4 | Organization and work planning skills: that are able to manage the use of the time as well as available resources and to organize the work in the laboratory. |
| B5 | Correct oral and written communication on scientific topics in the native language and at least in another International diffusion language. |
| B7 | Personal progress skills : that are able to learn from freelance way, adapting to new situations, developing necessary qualities as the creativity, skills of leadership, motivation for the excellence and the quality. |
| B8 | Critical reasoning skills and ethical commitment with the society: sensitivity in front of bioethical problems and to the ones related to the natural resource conservation |
| B9 | Skills of preparation, show and defense of a work. |
| C3 | Using ICT in working contexts and lifelong learning. |
| C4 | Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective. |
| C5 | Understanding the importance of entrepreneurial culture and the useful means for enterprising people. |
| C6 | Acquiring skills for healthy lifestyles, and healthy habits and routines. |
| C7 | Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development. |
| C8 | Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society. |

Learning outcomes



| Learning outcomes | Study programme competences / results | | |
|---|---------------------------------------|---|--|
| Understand the microbial cooperative behavior and the interactions of micro-organisms with other living beings at the molecular level | AR5 | BR5 BR7 BR8 | CC6 CC7 CC8 |
| Handle the techniques and understand the molecular basis of the fight against infections and resistance mechanisms | AR1 AR2 AR5 | BR1 | CC4 CC7 CC8 |
| Apply the molecular knowledge to understanding and solving problems | | BR1 BR2 BR3 BR4 BR7 BR8 BR9 | CC3 CC4 CC5 CC6 CC7 CC8 |

| Contents | |
|---|--|
| Topic | Sub-topic |
| Microbial cooperative behaviour | -Molecular basis for the cooperation -Practical implications |
| Microbial interactions | -Positive and negative interactions -Molecular basis of the interactions with other microorganisms, plants or animals |
| Mechanisms of resistance to antimicrobial agents | -Enzymes degrading antimicrobial agents -Expulsion pumps -Modification of targets -Regulation of porins |
| New anti-infectious therapies | -Phagotherapy against multi-resistant bacteria -Antitolerants |
| Bacterial tolerance and persistence | -Phenotypic studies -Molecular mechanisms |
| Practical study of different aspects involved in the resistance to antimicrobial agents | -PCR of involved genes -Gene cloning -Protein expression -Preparation of knock-out mutants -Studies of the regulation of the mechanisms of resistance through RNA analysis |

| Planning | | | | |
|--------------------------------|------------------------|--------------------------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies / Results | Teaching hours (in-person & virtual) | Student's personal work hours | Total hours |
| Short answer questions | B1 B2 B5 | 2 | 0 | 2 |
| Guest lecture / keynote speech | A5 C4 C5 C8 | 14 | 35 | 49 |
| Laboratory practice | A2 B4 C6 C7 | 7 | 7 | 14 |
| Seminar | A1 B3 B7 B8 B9 C3 | 1 | 7 | 8 |
| 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 |
| | |



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|--------------------------------|--|
| Short answer questions | Written test that will assess the grade of knowledge and understanding achieved by the student. |
| Guest lecture / keynote speech | Exposure by the teaching staff of the theoretical basis of the subject |
| Laboratory practice | Case study in the research laboratory of different aspects involved in resistance to antimicrobial agents carried out by the students. |
| Seminar | Working Group that will discuss certain aspects related to the subject, elaborating final conclusions |

Personalized attention

| Methodologies | Description |
|--|---|
| Guest lecture / keynote speech Laboratory practice Seminar | During the development of the subject will be addressed in the needs of the student and consultations relating to the subject matter, providing you the necessary support, both in person or through email. |

Assessment

| Methodologies | Competencies / Results | Description | Qualification |
|--------------------------------|------------------------|---|---------------|
| Guest lecture / keynote speech | A5 C4 C5 C8 | Avaliase pola proba de resposta breve | 0 |
| Laboratory practice | A2 B4 C6 C7 | Continuous assessment of practices | 25 |
| Seminar | A1 B3 B7 B8 B9 C3 | Active participation in the programmed seminars | 5 |
| Short answer questions | B1 B2 B5 | Written test on the knowledge acquired during the course, both in its theoretical and practical aspects | 70 |

Assessment comments

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| <p>Attendance is mandatory laboratory practices to be evaluated.</p> <p>To account for the final grade in the value obtained in sections of seminars, practical and oral presentation, the student must have passed the short answer questions, corresponding to the theory of the subject.</p> <p>The students that not pass the course at the first choice, must overcome the unapproved part at the second chance.</p> <p>In the case of very exceptional circumstances and properly justified, the Professor could exempt total or partially to the student in that concur of any process of evaluation. This Student would have to subjected it a particular examination that will not leave doubts envelope his level of knowledge, competitions, skills and abilities.</p> <p>"NO PRESENTADO" mark is obtained only when the student has not been submitted to the mixed test.</p> <p>If the number of "Matrículas de Honor" (Distinction Award) that can be granted in the first option, you will not be granted in the second chance even when the maximum score is reached.</p> |
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Sources of information

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| Basic | <ul style="list-style-type: none"> - Gerischer (Ed) (2008). Acinetobacter Molecular Biology. Caister Academic Press - Madigan, Martinko, Bender, Buckley y Stahl (2015). Brock. Biología de los microorganismos. 14ª edición. Pearson Educación, S.A. - Lederberg & Schaeter (Eds) (2009). Encyclopedia of Microbiology. 3rd edition. Academic Press |
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|----------------------|--|
| Complementary | <ul style="list-style-type: none">- Otero, Muñoz, Bernárdez & Fábregas (2005). "Quorum sensing": El lenguaje de las bacterias. Zaragoza. Acribia- Maragakis & Perl (2008). Acinetobacter baumannii: epidemiology, antimicrobial resistance, and treatment options. Clin Infect Dis 46(8): 1254-63- Vila, Martí & Sánchez-Céspedes (2007). Porins, efflux pumps and multidrug resistance in Acinetobacter baumannii. J Antimicrob Chemother 59(6): 1210-5- Gootz (2010). The global problem of antibiotic resistance. Crit Rev Immunol 30(1): 79-93- Pachón & Vila (2009). Treatment of multiresistant Acinetobacter baumannii infections. Curr Opin Invest Drugs 10(2): 150-6 <p>Señálanse varias revisions relacionadas directamente co contido da materia. Ademais, durante o desenvolvemento da materia proporcionares ó alumno outra bibliografía que dependerá dos seminarios programados e de calquera novidade que xurdise.</p> |
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Recommendations

Subjects that it is recommended to have taken before

Regulation of gene expression/610441006

Molecular Plant-Pathogen Interaction Mechanisms/610441018

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Cellular Techniques/610441001

Molecular Techniques/610441002

Advanced Cellular Biology/610441003

Cell Signaling/610441004

Genetic Variation Mechanisms/610441005

Regulation of gene expression/610441006

Other comments

Of all the subjects that it recommends to have studied previously, compulsory all of them of the master's degree, the technical subjects are considered to be fundamental.

The student has access to teacher presentations via Moodle, being these presentations only a guide for the study but never will be the total content of the matter.

(*)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.