



| Teaching Guide | | | | |
|---------------------|---|--------|--|-----------|
| Identifying Data | | | | 2014/15 |
| Subject (*) | Microbioloxía e biotecnoloxía ambiental | | Code | 610G02018 |
| Study programme | Grao en Bioloxía | | | |
| Descriptors | | | | |
| Cycle | Period | Year | Type | Credits |
| Graduate | 2nd four-month period | Fourth | Optativa | 6 |
| Language | Spanish | | | |
| Prerequisites | | | | |
| Department | Bioloxía Celular e Molecular | | | |
| 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 | Comprender o papel que desenvolven os microorganismos nos ecosistemas, a resultas da suas capacidades metabólicas e dos seus patróns de comportamento. A partires deste coñecemento previo, farase unha aproximación a cómo se poden empregar as devanditas capacidades microbianas para o beneficio da sociedade. | | | |

| 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 espécimes. |
| A9 | Identificar e utilizar bioindicadores. |
| A10 | Avaliar actividades metabólicas. |
| A13 | Realizar o illamento e cultivo de microorganismos e virus. |
| A14 | Desenvolver e aplicar produtos e procesos de microorganismos. |
| A15 | Deseñar e aplicar procesos biotecnolóxicos. |
| A26 | Deseñar experimentos, obter información e interpretar os resultados. |
| A30 | Manexar adecuadamente instrumentación científica. |
| A31 | Desenvolverse con seguridade nun laboratorio. |
| 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. |
| 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. |
| C6 | Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse. |
| 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 | | |
| To know the role of microorganisms in natural environments | A1 | B2 | C1 |
| | A2 | B3 | C4 |
| | A4 | B4 | C6 |
| | A13 | B5 | C8 |
| | | B6 | |
| | | B7 | |
| | | B8 | |
| | | B9 | |
| | | B10 | |
| | | B11 | |
| | | B12 | |
| | | B13 | |
| | To apply the metabolic capabilities of micro-organisms to solve environmental problems | A2 | B2 |
| A4 | | B3 | C4 |
| A9 | | B4 | C6 |
| A10 | | B5 | C8 |
| A13 | | B6 | |
| A14 | | B7 | |
| A15 | | B8 | |
| A26 | | B9 | |
| A30 | | B10 | |
| A31 | | B11 | |
| | | B12 | |
| | | B13 | |

| Contents | |
|---|---|
| Topic | Sub-topic |
| INTRODUCTION TO THE SUBJECT | -Environmental Microbiology: an historical overview |
| MICROBIAL BEHAVIOUR | -Cellular behaviour and environment -Microbial cooperative behaviour |
| MICROBIAL METABOLISM AND BIOGEOCHEMICAL CYCLES | -Microbial activity in the carbon cycle -Microbial activity in the nitrogen and sulfur cycles -Microbial conversions of other chemical elements |
| MICROBIAL INTERACTIONS | -Interactions between microorganisms and plants -Non-pathogenic interactions between microorganisms and animals |
| BIODEGRADATION, RECYCLING AND ENVIRONMENTAL BIOTECHNOLOGY | -Extremophiles -Microbial biodeterioration -Water treatment, depuration and control -Urban solid waste treatment -Bioremediation -Microbiological control of pests |
| PRACTICES | -Microbial sampling and detection from natural environments -Determination of microbial activity in natural environments -Study of the microbial behaviour: quórum sensing and biofilms |

Planning



| Methodologies / tests | Ordinary class hours | Student's personal work hours | Total hours |
|---------------------------------|----------------------|-------------------------------|-------------|
| Guest lecture / keynote speech | 24 | 48 | 72 |
| Seminar | 8 | 32 | 40 |
| Laboratory practice | 15 | 9 | 24 |
| Oral presentation | 2 | 3 | 5 |
| Mixed objective/subjective test | 3 | 0 | 3 |
| Personalized attention | 6 | 0 | 6 |

(*)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 | Exhibition by the teaching staff of the theoretical bases of the subject |
| Seminar | Realization of seminars, which may be theoretical and/or practical, related to the contents of the subject |
| Laboratory practice | Laboratory practices are mandatory attendance. In them will be addressed, from the experimental point of view, points in the session and keynote in the seminars. |
| Oral presentation | Each student will be required to develop and perform at least one oral presentation (10-15 minutes) of a scientific work related to the agenda of the matter, and that will determine the matter seminars. |
| Mixed objective/subjective test | Written test in which will value the degree of knowledge and understanding achieved by the student. |

| Personalized attention | |
|---|---|
| Methodologies | Description |
| Seminar Laboratory practice Oral presentation | During the development of the subject will be met the needs and the student queries related to the matter, providing the guidance and support that are needed, both in person and on-line. Within the personalized attention you can include mentoring requested by the student for the preparation of examinations, as well as the subsequent revision of the same, and the preparation of seminars and oral presentation provided for in the subject. |

| Assessment | | |
|---------------------------------|--|---------------|
| Methodologies | Description | Qualification |
| Mixed objective/subjective test | An examination in writing is made to assess the level of knowledge achieved. | 60 |
| Guest lecture / keynote speech | Computed on the mixed objective/subjective test | 0 |
| Seminar | The student must prepare a critical review of an original or published investigation study. Critical and synthesis abilities will have regard for the final mark. | 15 |
| Laboratory practice | Laboratory practices must be carried out by the student in the fixed dates. Continuous evaluation and a final test will be done to assess the level of knowledge of the student. | 15 |
| Oral presentation | At the end of the seminar sessions the students must carried out an oral presentation to show a scientific work. This scientific work could be original when the showed data have been obtained during the seminar or practical sessions. The fluency of the scientific language of the oral presentation and the answering ability will have regard for the final mark. | 10 |

| Assessment comments |
|---------------------|
|---------------------|



Attendance is mandatory laboratory practices to be evaluated, as well as having delivered and / or filled in a timely manner the tasks identified as mandatory.

To account for the final grade in the value obtained in sections of seminars, practical and oral presentation, the student must have passed the mixed test, corresponding to the theory of the subject.

The students that not pass the course at the first choice, must overcome the unapproved part at the second chance .

"NO PRESENTADO" mark is obtained only when the student has not been submitted to the mixed test.

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.

Sources of information

Basic

- Castillo y colaboradores (2005). Biotecnología ambiental. Editorial Tébar
- Marín, Sanz y Amils (2005). Biotecnología y medioambiente. Editorial Ephemera
- Madigan, Martinko, Dunlap y Clark (2009). Brock Biología de los microorganismos. Pearson Educación
- Atlas y Bartha (2002). Ecología microbiana y Microbiología ambiental. Pearson Educación S.A.
- Willey, Sherwood y Woolverton (2009). Microbiología de Prescott, Harley y Klein. 7ª ed.. McGraw-Hill

Complementary

- <http://microbewiki.kenyon.edu/index.php/MicrobeWiki> ().
- <http://microbiologyplace.com> ().
- Winans y Bassler (2008). Chemical Communication among Bacteria. ASM Press
- Maier, Pepper y Gerba (2009). Environmental Microbiology 2nd ed. Academic Press

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Bioquímica: Bioquímica I/610G02011
 Bioquímica: Bioquímica II/610G02012
 Microbiología/610G02015
 Microbiología aplicada e control microbiológico/610G02016
 Técnicas en Microbiología/610G02017

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.