



Teaching Guide

| Identifying Data | | | | | 2023/24 |
|--------------------------|---|--------|-----------------------|---------|---------|
| Subject (*) | Vegetal biotechnology | Code | 610475303 | | |
| Study programme | Mestrado Universitario en Biotecnoloxía Avanzada | | | | |
| Descriptors | | | | | |
| Cycle | Period | Year | Type | Credits | |
| Official Master's Degree | 2nd four-month period | First | Optional | 3 | |
| Language | SpanishGalicianEnglish | | | | |
| Teaching method | Face-to-face | | | | |
| Prerequisites | | | | | |
| Department | BioloxíaDepartamento profesorado máster | | | | |
| Coordinador | Pomar Barbeito, Federico | E-mail | federico.pomar@udc.es | | |
| Lecturers | Pomar Barbeito, Federico | E-mail | federico.pomar@udc.es | | |
| Web | masterbiotecnologiaavanzada.com/ | | | | |
| General description | <p>In this subject also participates teachers of the UVIGO: Pedro Pablo Gallego Vegas (email: pgallego@uvigo.es) Striking Mercedes Medina (email: medina@uvigo.es) Maria Esther Barreal Modroño (email: edesther@uvigo.es)</p> <p>This course covers the history and basic concepts of plant biotechnology: in vitro culture of cells, tissues and organs of plant, crop types and their applications and genetic engineering. The course includes a comprehensive view of the transformation plant genetics (concepts, processing methods and the use of genetically modified plants), the manipulation of plants and plant improvement.</p> <p>The students analyze in depth the impact of biotechnology and Genetically modified organisms on the society, reviewing aspects such as patents, regulations, ethical risks. The methodology used for the acquisition of knowledge will be the presentation and discussion, (Expository strategy or master) but included, innovatively Based Learning Problems (BLP), by which the student will have to work in a practical case, which allowed acquire skills course, being the protagonist of the learning process (strategy discovery and construction).</p> | | | | |

Study programme competences

| Code | Study programme competences |
|------|--|
| A21 | Coñecer os recursos microbianos, vexetais e animais de interese biotecnolóxico así como as súas aplicacións na industria alimentaria e agropecuaria. |
| A24 | Coñecer as estratexias de produción e mellora de alimentos por métodos biotecnolóxicos. |
| B1 | Capacidade de análise e síntese (localización de problemas e identificación das causas e a súa tipoloxía). |
| B2 | Capacidade de organización e planificación de todos os recursos (humanos, materiais, información e infraestruturas). |
| B3 | Capacidade de xestión da información (con apoio de tecnoloxías da información e as comunicacións). |
| B4 | Capacidade de planificación e elaboración de estudos técnicos en biotecnoloxía microbiana, vexetal e animal. |
| B5 | Capacidade de identificar problemas, buscar solucións e aplicarlas nun contexto biotecnolóxico profesional ou de investigación. |
| B6 | Capacidade de comunicación oral e escrita dos plans e decisións tomadas. |
| B7 | Capacidade para formular xuízos sobre a problemática ética e social, actual e futura, que propón a Biotecnoloxía. |
| B8 | Capacidade de comunicación eficazmente coa comunidade científica, profesional e académica, así como con outros sectores e medios de comunicación. |
| B9 | Capacidade de Traballo en equipo multidepartamental dentro da empresa. |
| B10 | Capacidade de Traballo nun contexto de sostibilidade, caracterizado por: sensibilidade polo medio ambiente e polos diferentes organismos que o integran así como concienciación polo desenvolvemento sostible. |
| B11 | Racionamento crítico e respecto profundo pola ética e a integridade intelectual. |
| B12 | Adaptación a novas situacións legais, ou novidades tecnolóxicas así como a excepcións asociadas a situacións de urxencia. |
| B13 | Aprendizaxe autónoma. |



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|-----|--|
| B14 | Liderazgo e capacidade de coordinación. |
| B15 | Sensibilización cara á calidade, o respecto medioambiental e o consumo responsable de recursos e a recuperación de residuos. |
| C4 | Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective. |
| 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. |

| Learning outcomes | | | |
|--|-----------------------------|---------------------------------|------------|
| Learning outcomes | Study programme competences | | |
| Knowing the plant resources, their biotechnological applications, the production processes and improved plant and food by biotechnological methods | AC21 AC24 | BC3 BC15 | CC7 |
| Having an integrated approach plant metabolism and the control of gene expression in order to address its handling, improvement and/or maintenance | AC24 | BC7 | |
| Know and use the techniques of in vitro culture and cell engineering of plants | | BC15 | |
| Knowing how to find and get information from the major databases on patents related to plant biotechnology | | BC3 | |
| Possessing a broad knowledge of the legal and ethical aspects related to plant biotechnology. | | BC7 | |
| Promoting the ability to manage information related to plant biotechnology and its transmission | | BC1 BC3 BC6 BC7 BC8 | |
| Understanding the interest, the advantages and requirements of working in multidisciplinary teams, organizing and planning appropriate resources. | | BC2 BC9 | CC4 CC7 |
| Promoting the ability to identify problems and find solutions and to plan and prepare technical studies within the field of plant biotechnology | | BC4 BC5 | CC7 |
| To promote, within the plant biotechnology industry, labor respectful to the environment. | | BC10 BC11 | CC7 |
| Promote autonomous learning ability, leadership, adaptation to new situations as well as sensitivity to quality and by respect for the environment in the field of plant biotechnology | | BC12 BC13 BC14 BC15 | CC7 |

| Contents | |
|----------|---|
| Topic | Sub-topic |
| Topic 1 | Introduction to the training program: content, sources and objectives, methodology and assessment |
| Topic 2 | Plant Biotechnology: basic concepts. History. |
| Topic 3 | In vitro culture of cells, tissues and organs vegetables. Types of crops. Biotechnological applications. |
| Topic 4 | Plant genomes and plant health resources in plant production |
| Topic 5 | Plant genetic transformation: concepts, methods, processing and use of biotechnology genetically modified plants. |
| Topic 6 | Plant breeding. Phytohormones and its agricultural applications |
| Topic 7 | Plant Biotechnology and society: patents, regulations, ethical issues and risks |
| BLP | BLP |

| Planning | | | | |
|-------------------------|--------------|----------------------|-------------------------------|-------------|
| Methodologies / tests | Competencies | Ordinary class hours | Student?s personal work hours | Total hours |
| Introductory activities | B1 | 1 | 0 | 1 |



| | | | | |
|---------------------------------|---|----|----|----|
| Guest lecture / keynote speech | A21 A24 B15 | 11 | 11 | 22 |
| Case study | A21 A24 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 C4 C7 | 2 | 28 | 30 |
| Oral presentation | B3 B4 B6 B7 B8 | 1 | 4 | 5 |
| Mixed objective/subjective test | A21 B1 B7 B9 | 1 | 0 | 1 |
| Case study | A21 B15 B14 B13 B12 B11 B10 B9 B8 B7 B5 B4 B3 B2 B1 C4 C7 | 10 | 3 | 13 |
| Personalized attention | | 3 | 0 | 3 |

(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

| Methodologies | |
|---------------------------------|--|
| Methodologies | Description |
| Introductory activities | Contact students / teachers. Presentation of the training program: teaching methodology, planning, development. presentation of the practical case. Assessment system. |
| Guest lecture / keynote speech | The explanation of the main concepts will complemented by an active discussion with the student, through questions to integrate, establish and clarify the key concepts. |
| Case study | Analysis of a case study with the purpose of the student, working in small groups, star in his self-learning guided by the teacher / tutor (learning strategy for discovery and construction). The case poses a problem complex, similar to those that students will face in real life, and for whose solution will have to be formed in theory and in practice. In other words, aims to discover knowing and not about the problem, and it should look information, selects, organizes, evaluates, interprets, integrates and finally proposes solutions using the scientific method. |
| Oral presentation | Prueba que consiste en la presentación del Caso respondiendo a las preguntas planteadas por el alcalde y las personas interesadas. |
| Mixed objective/subjective test | Prueba que incluye la autoevaluación del trabajo en equipo, que sirve para ponderar el trabajo realizado por cada miembro. |
| Case study | Oral presentation, using a computer program presentation of the work. Will be held in groups formed by 4-5 people. |

| Personalized attention | |
|------------------------|---|
| Methodologies | Description |
| Case study | Personalized tutorials will be held 1 hour per working group (physically or by videoconference): first for presentation of case study, second for monitoring and the last one for its completion. |

| Assessment | | | |
|---------------|---|--|---------------|
| Methodologies | Competencies | Description | Qualification |
| Case study | A21 A24 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 C4 C7 | Delivery of a written document to be resolved the issue raised in the case study. Oral presentation, using a computer program presentation of the work. Will be held in groups formed by 4-5 people. | 40 |



| | | | |
|---------------------------------|----------------|--|----|
| Oral presentation | B3 B4 B6 B7 B8 | Prueba que consiste en la presentación del Caso respondiendo a las preguntas planteadas por el alcalde y las personas interesadas. Se emplea una rúbrica para valorar los contenidos de la misma, que está disponible para los estudiantes desde el inicio de la materia. La nota es individual. | 40 |
| Mixed objective/subjective test | A21 B1 B7 B9 | Prueba que incluye la autoevaluación del trabajo en equipo, que sirve para ponderar el trabajo realizado por cada miembro. Se emplea una rúbrica para valorar los contenidos de la misma, que está disponible para los estudiantes desde el inicio de la materia. La calificación es individual y pondera la obtenida en la memoria. | 20 |

Assessment comments

Students who fail the assessment must redo the practical case basis, with the written and oral with the resolution of the same.
Any academic dishonesty will be penalised in accordance with the provisions of the current UDC regulations.

Sources of information

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|----------------------|---|
| Basic | Reinhard Renneberg, Darja SüBbier , Biotecnología para principiantes , 2008, Reverte Henry RJ, Plant conservation genetics , 2006, Food Products Press Herman, EB, Micropropagation systems, techniques and applications : 2006-2010 , 2010, Agritech Consultants Slater A., Scout N, Fowler M., Plant biotechnology: the genetic manipulation of plants, 2003, Ed. Oxford University Press Caballero JL, Muñoz J, Valpuesta V, Introducción a la biotecnología vegetal: métodos y aplicaciones, 2001, Ed. Publicaciones y Obra Social y Cultural Cajasur Serrano M, Piñol T, Biotecnología vegetal, 1991, Ed. Síntesis |
| Complementary | |

Recommendations

Subjects that it is recommended to have taken before

Genetic Engineering and Transgenetics /610475101
Cellular and Tissue Engineering/610475102
Organisation and management of a laboratory/610475201
Legal and ethical aspects in Biotechnology/610475203

Subjects that are recommended to be taken simultaneously

Environmental management and floor and air technology/610475403

Subjects that continue the syllabus

Master Thesis/610475006
External Practicals/610475007

Other comments

Se recomienda conocimientos de inglés, a nivel de comprensión de fuentes de información científica (libros y documentos) escritas para el correcto aprendizaje de las competencias de la materia

(*)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.