



Teaching Guide

Teaching Guide				
Identifying Data				2020/21
Subject (*)	Plant Biotechnology		Code	610441019
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	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía			
Coordinador	Bernal Pita da Veiga, María de los Ángeles	E-mail	angeles.bernal@udc.es	
Lecturers	Bernal Pita da Veiga, María de los Ángeles Pomar Barbeito, Federico	E-mail	angeles.bernal@udc.es federico.pomar@udc.es	
Web				
General description				
Contingency plan	<p>1. Modifications to the contents</p> <p>They will not modify the contents</p> <p>2. Methodologies</p> <p>When treating of a matter of the second cuatrimestre will be able to give three situations:</p> <p>A - To normal face-to-face Teaching, if the access to the Faculty was allowed in a schedule and aforo like the ones of before the pandemia. In this case would go back to a totally face-to-face system.</p> <p>B- Hybrid teaching or semipresencial, if the access to the Faculty was restricted in schedule or aforo. In this case there would be a combination of face-to-face and on-line teaching.</p> <p>C- No face-to-face, if the access to the Faculty was totally forbidden in this cuatrimestre. In this case the teaching would be totally no face-to-face</p> <p>*Teaching methodologies that are maintained</p> <p>In the case A, all.</p> <p>In the case B, introductory activities would give of rotatory face-to-face way (aforo face-to-face limited considering the final students number) and to the time the class transmission on-line with Teams.</p> <p>*Teaching methodologies that are modified</p> <p>In the case C, introductory activities would manage totally on-line.</p> <p>3. Mechanisms for personalized attention to students</p> <p>Email, tutorías by Teams and forums in Moodle, with daily attention in the case of the email and forums, and previous request of the student in the case of the tutorías by Teams.</p> <p>4. Modifications in the evaluation</p> <p>In the case A, face-to-face. In the cases B and C, on-line evaluation (Moodle and other institutional tools).</p> <p>*Evaluation observations:</p> <p>5. Modifications to the bibliography or webgraphy</p> <p>In the case A, any. In the cases B and C: if it was possible alternative books and/or additional in electronic format to which had access from the start of this cuatrimestre (conditioned to that publish in open in the next months or there is institutional subscription), and in any additional material case ad hoc generated by the professors.</p>			

Study programme competences

Code	Study programme competences
A4	Skills to apply molecular techniques to the study of the plant cell physiology, its response to external triggers and their biotechnological applications.
A5	Skills of understanding the microorganisms' role as pathogenic agents and as biotechnological tools.
A8	Skills of having an integrated view of the previously acquired knowledge about Molecular and Cellular Biology and Genetics, with an interdisciplinary approach and experimental work.



A10	Skills of modifying genes, proteins and chromosomes with biotechnological applications
B1	Analysis skills to understand biological problems in connection with the Molecular and Cellular Biology and Genetics.
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
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.
C1	Adequate oral and written expression in the official languages.
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.
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	
Ability to manage information: gather and interpret data, information and relevant results, draw conclusions and issue reasoned reports on scientific and biotechnological issues		BR1 BR3 BR8 BR9	
Knowing the importance of research, innovation and technological development in the economic and cultural advancement of society.		AR5 AR10	BR8 CC6 CC8
Ability to understand the current state of the Plant Biotechnology and use Basic terminology used in the field		AR4 AR8	BR1 CC8
Adequate oral and written expression in the official languages			CC1

Contents	
Topic	Sub-topic
Module 1. Historical development of the Plant Biotechnology	1. The 1ª and 2ª Green Revolution 2. What is the Plant Biotechnology?
Module 2. Technical approach of the Plant Biotechnology	1. Genetic engineering in plants: general concepts 2. Methods of obtaining of transgenic plants
Module 3. Main applications of the Plant Biotechnology	1. Transgenic Plants applications 2. Phytoremediation

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Introductory activities	C1 C8	0	1	1
Online forum	B1 C6	0	1	1
Document analysis	A4 A5 A8 A10 B1 B3 B8 B9	0	35	35
Collaborative learning	A4 A5 A8 A10 B1 B3 B8 B9 C1	0	35	35
Binary questions	A4 A5 A8 A10 B1 B3	0	1	1
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



Introductory activities	Activities used at beginning of any teaching-learning process to obtain information regarding student competences, interests and/or motivations in relation to specific learning outcomes, which educators may then incorporate in their planning to create more meaningful, effective learning experiences based on students' existing knowledge.
Online forum	Informal discussion space for students to exchange ideas concerning specific problem or topic. Interaction takes place in online learning environment using asynchronous communication tools (?forum?).
Document analysis	Research skills development involving use of audiovisual and/or bibliographical documents (documentary or film extracts, news items, advertising images, photographs, articles, legal texts, etc.) relating to specific topic of study, with targeted analysis activities. Used as introduction to topic, as focus for case study, to explain abstract processes and present complex situations, or as strategy for synthesising content (theoretical and practical).
Collaborative learning	Guided teaching-learning procedures (overseen in person and/or using ICT methods) based on organisation of class in which students work together to solve tasks assigned by teacher, with aim of optimising their learning experience and that of other members of group.
Binary questions	Objective test in which students are required to respond to a specific question using one of two closed answer options. (Answer options for binary questions are ?yes/no? or ?true/false?.)

Personalized attention

Methodologies	Description
Introductory activities	In tutorial sessions, each student will discuss with the teacher the progress of the course, and all questions that are submitted to the content thereof.
Binary questions	
Collaborative learning	This tutorial sessions will be by Teams preferably, with previously date by mail.
Online forum	
Document analysis	

Assessment

Methodologies	Competencies	Description	Qualification
Binary questions	A4 A5 A8 A10 B1 B3	To minimum qualification to surpass to matter will be of 5 points	30
Collaborative learning	A4 A5 A8 A10 B1 B3 B8 B9 C1	Concretion and clarity in the contents Consults of different sources of information	30
Online forum	B1 C6	Participation of active form and proposal of new threads of conversation in the forum	20
Document analysis	A4 A5 A8 A10 B1 B3 B8 B9	His contribution is not a reproduction of the text of origin, but a coherent synthesis in which only they appear the most important appearances of the same	20

Assessment comments

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Sources of information

Basic	<ul style="list-style-type: none"> - (2013). Genetic Improvements in Agriculture. The Plant Cell - (2010). The past, present and future of crop genetic modification. New Biotechnology Volume 27, Number 5 - (2014). A Really Useful Pathogen, Agrobacterium tumefaciens. American Society of Plant Biologists. The Plant Cell - (2000). Plantas transgénicas. Preguntas y respuestas. Boletín de la Sociedad Española de Biotecnología <p>Serrano M, Piñol T, Biotecnología vegetal, 1991, Ed. Síntesis Caballero JL, Muñoz J, Valpuesta V, Introducción a la biotecnología vegetal: métodos y aplicaciones, 2001, Ed. Publicaciones y Obra Social y Cultural Cajasur Slater A., Scout N, Fowler M., Plant biotechnology: the genetic manipulation of plants, 2003, Ed. Oxford University Press Henry RJ, Plant conservation genetics, 2006, Food Products Press Reinhard Renneberg, Darja Süßbier, Biotecnología para principiantes, 2008, Reverte Herman, EB, Micropropagation systems, techniques and applications: 2006-2010, 2010, Agritech Consultants</p>
Complementary	



Recommendations
Subjects that it is recommended to have taken before
Cellular Techniques/610441001 Molecular Techniques/610441002
Subjects that are recommended to be taken simultaneously
Molecular Plant-Pathogen Interaction Mechanisms/610441018
Subjects that continue the syllabus
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.