



## Teaching Guide

Teaching Guide				
Identifying Data				2019/20
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	Pomar Barbeito, Federico	E-mail	federico.pomar@udc.es	
Lecturers	Bernal Pita da Veiga, angeles Pomar Barbeito, Federico	E-mail	angeles.bernal@udc.es federico.pomar@udc.es	
Web				
General description				

## 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
Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.			CC1

## Contents

Topic	Sub-topic
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Tema 1.- Introduction	-
Tema 2.- In vitro culture	-
Tema 3.- Genetic transformation	-
Tema 4.- Biolistic	-
Tema 5.- GM applications	-
Tema 6.- Phytoremediation	-

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student's personal work hours	Total hours
Workbook	B1 B3 B8 C1	0	25	25
Field trip	C6 C8	10	0	10
Introductory activities	B1	2	0	2
Case study	A4 A5 A8 A10 B1 B3 B8 B9	18	18	36
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
Workbook	The nature of this course is blended. Following a presentation of the contents thereof, different ppt files and text for self-study student will be added to the distance learning moodle platform. These files are self-explanatory, but if necessary it may consult with teachers via email or in person
Field trip	It raises at least one outlet to an industry / science center where views methodologies applied in the subject
Introductory activities	In a single initial session the subject will be presented explaining its methodology and the evaluation method
Case study	the student is faced with a hypothetical case to be resolved by applying the knowledge you gain from working the readings. In a first phase, the work will be done in groups, in a second phase to work individually.

Personalized attention	
Methodologies	Description
Workbook Case study	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.  Four specific tutorial sessions to develop the case also be scheduled.  Students with a part-time or semi-face attendance will make tutorials using telematic methods with teachers throughout all or course.

Assessment			
Methodologies	Competencies	Description	Qualification
Workbook	B1 B3 B8 C1	After a presentation of the contents of the asignatura, will go incorporating to the platform of moodle, different archives ppt and of text for the autonomous study of the student. These archives will be autoexplains, although it was necessary could consult with the teacher, via email or in person	1
Case study	A4 A5 A8 A10 B1 B3 B8 B9	Following the work of "case study" the student has to submit its findings to the teaching staff who will assess the use of the information provided to the student, and the degree of understanding of it. Will also take into account the management of existing sources of information.	99

Assessment comments
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The score needed to pass the course will be 5 points. Students who do not meet this note must repeat the assignment.

Since the case study does not require physical attendance, the evaluation of semi-face learning students or part-time dedication recognized, it is the same as the other students

## Sources of information

<b>Basic</b>	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
<b>Complementary</b>	

## Recommendations

### Subjects that it is recommended to have taken before

### Subjects that are recommended to be taken simultaneously

Molecular Plant-Pathogen Interaction Mechanisms/610441018

### Subjects that continue the syllabus

Cellular Techniques/610441001

Molecular Techniques/610441002

### 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.