Teaching Guide				
Identifying Data				2015/16
Subject (*)	Biotecnoloxía en plantas		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	Optativa	3
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Bioloxía Animal, Bioloxía Vexetal e Ecoloxía			
Coordinador	Bernal Pita da Veiga, angeles	E-mail	angeles.bernal@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 / results	
Code	Study programme competences / results
A4	Skills to apply molecular techniques to the study of the plant cell physiology, its response to external triggers and their biotechnological applications.
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.
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.
C6	Considering critically the knowledge, technologies and the available information to solve problems with which should face.
C8	Considering the importance that the investigation has, the innovation and the technological development in the socioeconomic advance and cultural of the society.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Knowing the importance of research, innovation and technological development in the economic and cultural advancement of society.		BR8	CC6 CC8
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	
Ability to understand the current state of the Plant Biotechnology and use Basic terminology used in the field	AR4 AR8	BR1	CC8

Contents	
Topic	Sub-topic
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 / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Workbook	B1 B3 B8	0	25	25
Field trip	C6 C8	4	4	8
Introductory activities	B1	1	0	1
Case study	A4 A8 B1 B3 B8 B9	4	35	39
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.

Assessment			
Methodologies	Competencies / Results	Description	**Qualification**
Workbook	B1 B3 B8	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 could consult with the teacher, via email or in person	1
Case study	A4 A8 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
The score needed to pass the course will be 5 points. Students who do not meet this note must repeat the assignment.

Sources of information

Basic	Serrano M, Piñol T, Biotecnología vegetal,1991, Ed. SíntesisCaballero JL, Muñoz J, Valpuesta V,Introducción a la biotecnología vegetal: métodos y aplicaciones, 2001, Ed.Publicaciones y Obra Social y Cultural CajasurSlater A., Scout N, Fowler M., Plantbiotecnology: the genetic manipulation of plants, 2003, Ed. Oxford UniversityPressHenry RJ, Plant conservation genetics , 2006,Food Products PressReinhard Renneberg, Darja SüBbier , Biotecnologíapara principiantes , 2008, ReverteHerman, EB, Micropropagation systems,techniques and applications : 2006-2010 , 2010, Agritech Consultants
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Mecanismos Moleculares da Interacción Planta-patóxeno/610441018
Subjects that continue the syllabus
Técnicas Celulares/610441001 Técnicas Moleculares/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.