Teaching Guide				
Identifying Data				2020/21
Subject (*)	Cellular and Tissue Engineering		Code	610475102
Study programme	Mestrado Universitario en Biotecnoloxía Avanzada			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	First	Obligatory	3
Language	SpanishGalicianEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	BioloxíaDepartamento profesorado másterFisioterapia, Medicina e Ciencias Biomédicas			
Coordinador	Arufe Gonda, María del Carmen	E-mail	maria.arufe@udc.es	
Lecturers	Arufe Gonda, María del Carmen Bernal Pita da Veiga, María de los Ángeles	E-mail	maria.arufe@udc.es angeles.bernal@udc.es	
Web	masterbiotecnologiaavanzada.com/			
General description	EN LA DOCENCIA DE LA MATERIA PARTICIPAN TAMBIÉN LA SIGUIENTE PROFESORA DEL INIBIC (INSTITUTO DE INVESTIGACIÓN BIOMÉDICA DE A CORUÑA): Mª Nieves Doménech García Esther Rendal Vázquez La ingeniería celular y tisular constituye un área emergente en la citología e histología humana de nuestros días. Surge como resultado de la progresiva aplicación biotecnológica de las células vegetales y animales, así como de los nuevos tejidos construidos a partir de conocimiento derivado del desarrollo embrionario, de los novedosos modelos desarrollados in vitro, y de la unión de ambos tipos de aproximaciones. Se trata de un área en expansión que asentada en los conocimientos básicos de la citología e histología tiene por objetivo cultivar, conservar, caracterizar y modificar células vegetales y/o animales y construir tejidos nuevos, funcionalmente activos, a partir de células procedentes de cultivos desarrollados previamente y de biomateriales de distinta naturaleza que sirven como soporte o andamiaje.			
Contingency plan	1. Modifications to the contents 2. Methodologies *Teaching methodologies that are maintained *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students 4. Modifications in the evaluation *Evaluation observations: 5. Modifications to the bibliography or webgraphy			

Study programme competences / results	
Code	Study programme competences / results
A1	Saber buscar e analizar a biodiversidade de microorganismos, plantas e animais así como seleccionar os de maior interese biotecnolóxico (aplicado).
A2	Ter unha visión integrada do metabolismo e do control da expresión xénica para poder abordar a súa manipulación.
A3	Coñecer as aplicacións biotecnolóxicas dos microorganismos, plantas e animais e saber manipulalos de cara á súa aplicación biotecnolóxica.

A4	Coñecer e saber usar as técnicas de cultivo e a enxeñaría celular.
A5	Coñecer os principios da xenómica e a proteómica.
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 aplicalas nun contexto biotecnolóxico profesional ou de investigación.
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.
B13	Aprendizaxe autónoma.
B15	Sensibilización cara á calidade, o respecto medioambiental e o consumo responsable de recursos e a recuperación de residuos.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C5	Entender a importancia da cultura emprendedora e coñecer os medios ao alcance das persoas emprendedoras.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Handling the main techniques to obtain and maintain different cell cultures	AC1 AC3	BC1 BC3 BC15	CC3 CC6 CC7 CC8
Handling equipment for the cellular and molecular techniques	AC1 AC2 AC3 AC4 AC5	BC1 BC3 BC5	CC3 CC6 CC7 CC8
To use different techniques protocols	AC3 AC4	BC1 BC2 BC3 BC4 BC5 BC10 BC13	CC3 CC8
Know the applications of the various techniques in cell culture	AC3 AC4 AC5	BC10 BC11 BC13	CC3 CC5 CC7 CC8

Contents	
Topic	Sub-topic
Introduction to the cellular crop animal. Generalities on the technicians of cellular crop.	Introduction to the cellular crop animal. Methods of isolation of cells from blood or issues. Work in esterilid situations. Generalities on the technicians of cellular culture.

Methods of conservation and characterisation of cellular cultures.	Methods of culture, of growth, of differentiation and of freezing. Methods of characterisation of cellular cultures
Analysis and fenotipic of the cells.	Hystomorphologyc analysis of the cells. Fenotipic by inmunohistochimie. Fenotipado By Cytometry of flow
Introduction in the engineering tisular: concept and perspectives.	Introduction in the engineering tissus. Supports and biomaterials. Clinical applications. Therapeutic perspectives
Plant cell cultures	In vitro cultures of plant material. Basic methodology. Celular cultures. Plant regeneration

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Laboratory practice	A1 A3 A4 B1 B2 B3 B4 B5 B10 C3 C5 C6 C7 C8	8	8	16
Multiple-choice questions	A1 A2 A3 A4 A5 B10 B11 B13 B15	2	10	12
Workbook	B1 B3 B7 C6 C7 C8	1	2	3
Guest lecture / keynote speech	B1 B3 B5	14	28	42
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
Laboratory practice	They develop technicians of current use in biomedic investigation, that complement the knowledges given in the session magistral.
Multiple-choice questions	Examination type test, in which each question consists in 4 affirmations of which only one is correct.
Workbook	Reading of a notable scientific article and related with the matter given
Guest lecture / keynote speech	Participatory theoretical class, favouring the exchange of opinions, the debate and the answer of the questions formulated by the student

Personalized attention	
Methodologies	Description
Laboratory practice	Treat of a group reduced of students,it is possible the resolution of doubts and the follow-up individualize during the same process of learning. In particular, the magistral session is participatory, favouring the exchange of opinions, the interchange of ideas and the answer of the questions formulated. The practices of laboratory are revised at all times by the teachers and, if necessary, by the group of investigation in which it integrates the student.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Laboratory practice	A1 A3 A4 B1 B2 B3 B4 B5 B10 C3 C5 C6 C7 C8	They develop technicians of current use in biomedical investigation, that complement the knowledges given in the magistral session	50

Multiple-choice questions	A1 A2 A3 A4 A5 B10 B11 B13 B15	Examination type test, in which each question consists in 4 affirmations of which only one is correct.	50

Assessment comments
To pass the matter, it is necessary to obtain as a whole a minimum of 5 on 10 and, in each methodology evaluated, a minimum of 2,5 on 5.

Sources of information	
Basic	R. Ian Freshney. Culture of animal cells. A manual of Basic Research. Ed. Wiley-Liss and sons. Inc. Publications. New York Irving L., Weissman and Judith A. Shizuru. The origins of the identification and isolation of hematopoietic stem cells, and their capability to induce donor-specific transplantation tolerance and treat autoimmune diseases. Blood, Vol112, Number 9 Tizianao Barberi and Lorenz Studer. Methods in enzymology. Vol. 418. Differentiation of embryonic stem cells. Cap. 12:Mesenchymal Cells. Ferraris. Histologia, Embriologia E Ingenieria Tisular (Spanish Edition), 2009. Ed. Medica Panamericana. Benítez Burraco, A. 2005. Avances recientes en Biotecnología vegetal e ingeniería genética de plantas. Editorial Reverté. Loyola-Vargas, VM e Vázquez-Flota, F. 2006. Plant cell culture protocols-Humana Press 2 Edition. Trigiano, R.N. e Gray, DJ. 2004. Plant development and biotechnology. CRC http://campus.usal.es/~histologia/
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Genetic Engineering and Transgenetics /610475101
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Vegetal biotechnology/610475303 Animal biotechnology/610475304
Other comments
Since it splits of the bibliography recommended for this matter finds in English, is advisable to have knowledges of this language, at least, to level of understanding of texts written.