



Teaching Guide

Identifying Data					2014/15
Subject (*)	Proteínas Recombinantes e Inxeniería de Proteínas		Code	610441012	
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	SpanishGalicianEnglish				
Prerequisites					
Department	Bioloxía Celular e Molecular				
Coordinador	Gonzalez Siso, Maria Isabel		E-mail	isabel.gsiso@udc.es	
Lecturers	Becerra Fernandez, Manuel Gonzalez Siso, Maria Isabel		E-mail	manuel.becerra@udc.es isabel.gsiso@udc.es	
Web					
General description	<p>A importancia actual dos procesos enzimáticos aplicados á industria alimentaria ou farmacolóxica e tal, que permite a produción de compostos que non poderían obterse de ningún outro xeito. A produción industrial de enzimas e un negocio que a comezos do século XXI move en torno a 1600 millóns de dolares ao ano.</p> <p>A utilización de enzimas en procesos industriais vese limitada en ocasións por factores inherentes á natureza das enzimas como por exemplo a súa falla de estabilidade fronte a condicións extremas de temperatura ou pH, a súa desnaturalización en presenza de solventes orgánicos ou a súa escasa actividade fronte a determinados sustratos. Na actualidade hay un amplo abano de técnicas de expresión e de Enxenería de Proteínas que permiten a xeración de proteínas modificadas co obxectivo de subsanar estas limitacións. Existe unha ampla gama de produtos desenvolvidos por estas vías que se empregan en diversos campos.</p> <p>Nesta asignatura describiranse métodos actuais para a expresión e modificación de proteínas, de uso tanto en investigación básica como en aplicacións biotecnolóxicas.</p>				

Study programme competences

Code	Study programme competences
A14	Skills to apply molecular techniques to the study of the plant cell physiology, its response to external triggers and their biotechnological applications.
B3	Skills of decision making for the problem solving: that are able to apply theoretical knowledges and practical acquired in the formulation of biological problems and the looking for solutions.
B7	Personal progress skills : that are able to learn from freelance way, adapting to new situations, developing necessary qualities as the creativity, skills of leadership, motivation for the excellence and the quality.
C3	Skills of Using basic tools of the information technologies and communications (ICT) necessary to the exercise of his profession and for the apprenticeship over his life.
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

Subject competencies (Learning outcomes)	Study programme competences		
Ability to learn and use biochemical concepts, techniques and resources available in databases related to the subject	AR10	BR7	CC3 CC8
Ability to solve practical cases through the acquisition of skills that allow to carry out a simulated project of expression of recombinant proteins and directed evolution of proteins.	AR10	BR3 BR7	CC3 CC8

Contents

Topic	Sub-topic



Systems for expresión of native and recombinant proteins: bacterias	Systems of expression of Heterologous proteins in bacteria and purification.
Systems for expresión of native and recombinant proteins: yeasts	Systems of expression of Heterologous proteins in yeast and down-stream processing.
Systems for expresión of native and recombinant proteins: animal cells	Genetic manipulation of animal cells. Systems of expression and production of proteins in mammalian cells.
Protein engineering I	Introduction. Site-directed mutagenesis techniques.
Protein engineering II	Techniques of artificial evolution of proteins.
Protein engineering III	Techniques of stabilization and immobilization of enzymes.
Industrial applications of protein engineering	Applications in Enzymology, pharmaceutical, food industry and other applications.

Planning			
Methodologies / tests	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	8	8	16
Laboratory practice	10	12	22
Mixed objective/subjective test	2	16	18
Directed discussion	8	8	16
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
Guest lecture / keynote speech	Oral presentation complemented with the use of audiovisual media in order to pass on knowledge and facilitate learning.
Laboratory practice	A methodology that allows students to learn effectively through practical activities.
Mixed objective/subjective test	Exam comprising questions type of testing trial, questions objective type testing and resolution of cases and problems.
Directed discussion	Technique of group dynamics in which the members of a group discussed free, informal and spontaneous way on a subject, coordinated by a moderator.

Personalized attention	
Methodologies	Description
Directed discussion	The directed discussion is conceived as moments of face-to-face student work with the teacher by involving compulsory student participation.

Assessment		
Methodologies	Description	Qualification
Mixed objective/subjective test	Test to evaluate the knowledge acquired during the master classes, practical classes of laboratory as well as directed discussion Competencies A14 and B7 will be evaluated with this methodology	50
Guest lecture / keynote speech	Regular attendance and active participation to the guest lecture will be evaluated	10



Laboratory practice	Regular attendance and active participation to laboratory practices as well as the report made by students will be evaluated Competencies A14 and B3 will be evaluated with this methodology	20
Directed discussion	Regular attendance and active participation will be evaluated Competencies A14, B3, B7, B8 will be evaluated with this methodology	20

Assessment comments

To get honours preference will be given to the best notes of the call of June

Sources of information

Basic	
Complementary	

Recommendations

Subjects that it is recommended to have taken before

Traballo de Máster/610441022

Subjects that are recommended to be taken simultaneously

Dinámica e Estructura de Proteínas/610441011

Bioinformática e Modelado de Biomoléculas/610441020

Subjects that continue the syllabus

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.