Teaching Guide				
Identifying Data				2022/23
Subject (*)	Neurobiology		Code	610441008
Study programme	Máster 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	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	BioloxíaEmpresa			
Coordinador	Díaz Prado, María Luz	E-mail	luz.diaz@udc.es	
Lecturers	Díaz Prado, María Luz Folgueira Otero, Mónica	E-mail	luz.diaz@udc.es m.folgueira@udc.es	
Web	campusvirtual.udc.gal			
General description	Knowledge of basic biological mechanisms by which the nervous system controls behavior, the interaction between the sensory and motor systems and integration of different neural circuits.			

Study programme competences	
Code	Study programme competences
A6	Skills of understanding the functioning of cells through the structural organization, biochemistry, gene expression and genetic variability.
A7	Skills of knowing and analyzing specific cellular systems as stem cells, nerve cells, cells of the immune system, or other cells related to several pathologies.
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.
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
B5	Ability to draft, represent, analyze, interpret and present technical documentation and relevant data in the field of the branch of knowledge of the master's degree in the native language and at least in another International diffusion language.
B9	Skills of preparation, show and defense of a work.
C1	Ability to express oneself correctly, both orally and in writing, in the official languages of the autonomous community
C2	Ability to know and use appropriately the technical terminology of the field of knowledge of the master, in the native language and in English, as a language of international diffusion in this field
C8	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.
C9	Ability to manage times and resources: developing plans, prioritizing activities, identifying critical points, establishing goals and accomplishing them.

Learning outcomes			
Learning outcomes	Study programme competences		
Students will acquire knowledge on the basic mechanisms by which the nervous system regulates behaviour, interaction between motor and sensory systems and integration of the different neural circuits.	AR6 AR7 AR8	BR3 BR5 BR9	CC1 CC2 CC8 CC9

Contents	
Topic	Sub-topic

1) Neuron Doctrine: historical introduction to modern neurobiology	Reticular Theory Golgi?s technique and Santiago Ramón y Cajal?s studies Neuron Doctrine
2) Neuron organization and signalling	Basic structure of the neuron Types of neurons Electrical synapse Chemical synapse
3) The changing brain	Early development of the nervous system Formation of neural circuits Modification of neural circuits and synaptic plasticity
4) Anatomic organization of the nervous system	Anatomy of the central nervous system Anatomy of the peripheral nervous system Basic notions on comparative neuroanatomy
5) Neural basis of sensory perception	Somatic sensory system Visual system Chemosensory system Auditory and vestibular system Pain. Visceral sensitive system.
6) Neural control of motor activity and its coordination	General organization of the systems involved in motor control
7) Complex encephalic functions	Learning and memory Emotions
8) Techniques for the study of the encephalon	Transgenics. Optogenetics

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A6 A7 A8	7	14	21
Laboratory practice	C8	7	7	14
Document analysis	B3 B5 B9 C1 C2 C9	6	24	30
Objective test	A6 A7 A8	2	6	8
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
Guest lecture / keynote speech	Lectures will be sixty minutes long. Teachers will discuss the contents of the syllabus. Students are advised to read in advance about some fundamental aspects of the class in the recommended texts.

Laboratory practice	The laboratory practices are configured as an essential part of the subject. During its development, aspects related to: - Identification of different regions of the nervous system - The use of animal models for the study of the nervous system under normal and / or pathological conditions. - The use of mutant and transgenic lines in Neuroscience studies - The management of interactive pages, on-line Neuroanatomy atlases and web links related to practical contents. At the end of the internship period, students must submit a report on them.
Document analysis	Each student will read a recent article that has been designated by the teacher and complements contents of lectures. Students will present a brief summary of their article, followed by a discussion with the rest of the class.
Objective test	It will be an exam about the contents reflected on the syllabus of the subject. The exam will consist of multiple choice, true/false and/or questions to be answered briefly.

Personalized attention	
Methodologies	**Description**
Document analysis Laboratory practice	

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Document analysis	B3 B5 B9 C1 C2 C9	There will be a discussion of a current research article, in which the student must participate actively after having carried out the individual critical analysis of it.	10
Objective test	A6 A7 A8	It will consist of any of the following types of questions: multiple choice, gap-filling, matching, ordering answers, and short answers.	70
Laboratory practice	C8	At the end of the practice period, students must submit a report or abstract related to the contents of the practical activities carried out.	20
Others			

Assessment comments
OBSERVATIONS: The laboratory practices are configured as an essential part of the subject, so their completion will be face-to-face. It is a necessary condition that all students approve the activities "Document analysis" and "Laboratory practice" to be able to pass the subject. In the case of the second oportunity of the call for the current year (July call), the evaluation system planned for the first opportunity will be maintained, both for students who have failed any of the parts and for those students that has not been presented to them. Honors will be awarded to students who present themselves at the first opportunity of each call. The fraudulent performance of tests or evaluation activities will lead to the application of current regulations in this regard.

Sources of information	
Basic	Bibliografía básica: - Dale Purves et al. (2008). Neuroscience. Sinauer Associates, cop. 4th ed.- Eric R. Kandel, James H. Schwartz, Thomas M. Jessell (2000).Principios de neurociencia. McGraw Hill-Interamericana.- Greg Lemke (2009). Developmental neurobiology. Academic Press-Elsevier.- John H. Byrne; James L. Roberts (2009). From molecules to networks an introduction to cellular and molecular neuroscience. Elsevier. - Larry Squire et al. (2008). Fundamental neuroscience. Academic Press.- Daniel P. Cardinale (2007). Neurociencia aplicada: sus fundamentos. Editorial Médica Panamericana.
Complementary	

Recommendations

Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Citoloxía/610212103 Histoloxía Vexetal e Animal/610212104 Organografía Microscópica/610212628
Other comments
Students are advised students to study making use of all material available, including the recommended bibliography and web sources.It is recommended to limit the delivery of works to computer support to comply with the Green Campus program of the Faculty.

(*)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.