Teaching Guide				
Identifying Data				2021/22
Subject (*)	Neurobiology		Code	610441008s
Study programme	Máster Universitario en Bioloxía Molecular, Celular e Xenética (semipresencial)			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	3
Language	Spanish			
Teaching method	Hybrid			
Prerequisites				
Department	BioloxíaCiencias Biomédicas, Medicina e FisioterapiaEmpresaFisioterapia, Medicina e Ciencias Biomédicas			
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.			
Contingency plan	1. Modifications to the contents No changes are planned in the contents. 2. Methodologies *Teaching methodologies that are maintained The teaching methodologies described in this teaching guide will be maintained, but will be adapted to the online modality. *Teaching methodologies that are modified The methodology will be adapted to the telematic modality, carried out through Microsoft Teams. In addition, all the material to be used will be made available to students on the Moodle platform. The laboratory practices will be adapted to the existing circumstances and, if necessary, will be replaced by non-contact activities (viewing of methodological videos, study of microscopy images, case studies, analysis and interpretation of data ...). The tests or exams will be carried out through the Moodle platform. The doubts that are raised to the students will be dealt with electronically. 3. Mechanisms for personalized attention to students Personalized attention will be limited to telematic means. Moodle: whenever it is required (according to the student's need or demand). Microsoft Teams: whenever it is required (according to the student's need or demand). E-mail: whenever required (at the request of the student body). Use to make inquiries, request virtual meetings to resolve doubts or other clarifications related to the matter. 4. Modifications in the evaluation The evaluation system included in the teaching guide is maintained, although the tests will be carried out electronically through Moodle. *Evaluation observations: The evaluation criteria and the observations collected in the teaching guide are maintained. 5. Modifications to the bibliography or webgraphy No modifications are foreseen. If necessary, supplementary means will be provided.			

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	6	14	20
Laboratory practice	C8	7	7	14
Document analysis	B3 B5 B9 C9 C2 C1	3	24	27
Objective test	A6 A7 A8	2	6	8
Personalized attention		6	0	6
(*)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	Sessions of 60 minutes of approximate duration on the contents correponding to the subject. For a full use of them, it is recommended that the student has previously reviewed the fundamental aspects of the different contents in the texts and web links that are recommended in the "Information sources" section. In addition, students will have the contents of the topics developed in this subject on the "Virtual Campus" platform in different formats (pdf, ppt, recordings, videos ...).
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 in 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	It will consist of individual reading of recent Neurobiology articles designated by the teaching staff and that complement the contents of the lectures. Subsequently, the students will present a brief summary of the assigned article, which will serve as the basis for the subsequent guided discussion. The materials necessary to develop this activity will be provided by the teaching staff, in advance, through the Virtual Campus platform. The students will be able to consult their doubts with the teaching staff through email, chats and video calls.
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. The exam will be carried out preferably online through the Virtual Campus platform.

Personalized attention	
Methodologies	**Description**
Document analysis Laboratory practice	Students can consult their specific doubts during the lectures. In addition, it will have personalized tutorials to consult your doubts related to the theoretical and practical matter and with the activities programmed in the discipline. The teaching staff will communicate with the students through official channels (videoconference, forums, email, chat). Given the purpose of these tutorials, an attempt will be made to make the schedule the most suitable for the teacher and the student, prior agreement between the two.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
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
Document analysis	B3 B5 B9 C9 C2 C1	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
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 content of the subject, so their attendance will be face-to-face and mandatory. 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.Enlaces web: https://www.ncbi.nlm.nih.gov/books/NBK20385/ https://www.brainfacts.org/ https://www.frontiersin.org/journals/neurosciencehttps://www.ncbi.nlm.nih.gov/books/NBK10799 https://neurophysics.ucsd.edu/courses/physics_171/Neuroscience%20Exploring%20the%20Brain%20-%20Bear,%20Mark%20F.%20[SRG].pdf
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 independently making use of all material available, including the recommended bibliography and web sources.It is recommenden 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.