



Teaching Guide

Identifying Data					2023/24
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	<p>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.</p> <p>BLENDED LEARNING STUDENTS WHO CHOOSE THIS SUBJECT WILL HAVE TO DO ALL THE ACTIVITIES IN PERSON.</p>				

Study programme competences / results

Code	Study programme competences / results
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 / results		
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	BR3	CC1
	AR7	BR5	CC2
	AR8	BR9	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 / Results	Teaching hours (in-person & virtual)	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 C1 C2 C9	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	<p>Sessions of 60 minutes of approximate duration on the contents corresponding to the subject.</p> <p>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.</p> <p>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 ...).</p>
Laboratory practice	<p>The laboratory practices are configured as an essential part of the subject.</p> <p>During its development, aspects related to:</p> <ul style="list-style-type: none"> - 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. <p>At the end of the internship period, students must submit a report on them.</p>
Document analysis	<p>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.</p> <p>The materials necessary to develop this activity will be provided by the teaching staff, in advance, through the Virtual Campus platform.</p> <p>The students will be able to consult their doubts with the teaching staff through email, chats and video calls.</p>
Objective test	<p>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.</p> <p>The exam will be carried out preferably online through the Virtual Campus platform.</p>

Personalized attention

Methodologies	Description
Document analysis	Students can consult their specific doubts during the lectures.
Laboratory practice	<p>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.</p> <p>The teaching staff will communicate with the students through official channels (videoconference, forums, email, chat).</p> <p>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.</p>

Assessment

Methodologies	Competencies / Results	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 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
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:

STUDENTS WHO CHOOSE THIS SUBJECT WILL HAVE TO CARRY OUT ALL THE ACTIVITIES IN PERSON.

The laboratory practices are configured as an essential part of the content of the subject, so their attendance 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 opportunity 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 registrations will be awarded preferably among students who present themselves at the first opportunity of each call.

The fraudulent performance of tests or evaluation activities, once verified, will directly imply the qualification of fail in the call in which it is committed: the student will be graded with "suspense" (numerical grade 0) in the corresponding call of the academic year, both if the infraction is committed in the first opportunity as in the second. To do this, your rating in the first chance report will be modified, if necessary.

Sources of information

Basic	<p>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/neuroscience https://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</p>
Complementary	

Recommendations

Subjects that it is recommended to have taken before

Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus

Citología/610212103

Histología Vegetal e Animal/610212104

Organografía Microscópica/610212628

Other comments



BLENDED LEARNING STUDENTS WHO CHOOSE THIS SUBJECT WILL HAVE TO DO ALL THE ACTIVITIES IN PERSON. Students are advised to study independently making use of all material available, including the recommended bibliography and web sources. Gender perspective As stated in the different

regulations applicable to university teaching, the gender perspective must be incorporated in this matter (non-sexist language will be used, bibliography of authors of both sexes will be used, student participation in class will be encouraged. . .)

Work will be done to identify and modify prejudices and sexist attitudes and influence the environment to modify them and promote values of respect and equality.

Situations of discrimination based on gender must be detected and actions and measures to correct them will be proposed. Green Campus Program of the Faculty of Sciences

To help achieve an immediate sustainable environment and comply with point 6 of the "Environmental Declaration of the Faculty of Sciences (2020)", the documentary work carried out in this matter: a Most of them will be requested in virtual format and on computer support. b. To make on paper: - No plastics will be used. - Double-sided printing will be done. - Recycled paper will be used. - It will avoid making drafts of the works.

(*)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.