



Teaching Guide				
Identifying Data				2021/22
Subject (*)	Fundamentals of neuroscience	Code	614522015	
Study programme	Mestrado Universitario en Bioinformática para Ciencias da Saúde			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	1st four-month period	Second	Optional	3
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da InformaciónFisioterapia, Medicina e Ciencias Biomédicas			
Coordinador	Cudeiro Mazaira, F.Javier	E-mail	javier.cudeiro@udc.es	
Lecturers	Cudeiro Mazaira, F.Javier Porto Pazos, Ana Belen Rivadulla Fernandez, Juan Casto	E-mail	javier.cudeiro@udc.es ana.portop@udc.es casto.rivadulla@udc.es	
Web	moodle.udc.es			
General description	Introducción o funcionamento do sistema nervioso, para que o estudante entenda conceptos como neuromodulación, redes neuronais, circuitos, etc dende un punto de vista fisiolóxico que lle permita logo aplicar estes coñecementos nas aproximacións teóricas ó sistema			
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
A3	CE3 ? To analyze, design, develop, implement, verify and document efficient software solutions based on an adequate knowledge of the theories, models and techniques in the field of Bioinformatics
A4	CE4 - Ability to acquire, obtain, formalize and represent human knowledge in a computable form for the resolution of problems through a computer system in any field of application, particularly those related to aspects of computing, perception and action in bioinformatics applications
A7	CE7 - Ability to identify the applicability of the use of bioinformatics tools to clinical areas.
B1	CB6 - Own and understand knowledge that can provide a base or opportunity to be original in the development and/or application of ideas, often in a context of research
B2	CB7 - Students should know how to apply the acquired knowledge and ability to problem solving in new environments or little known within broad (or multidisciplinary) contexts related to their field of study
B3	CB8 - Students to be able to integrate knowledge and deal with the complexity of making judgements from information that could be incomplete or limited, including reflections on the social and ethical responsibilities linked to the application of their skills and judgments



B4	CB9 - Students should know how to communicate their findings, knowledge and latest reasons underpinning them to specialized and non-specialized audiences in a clear and unambiguous way
B5	CB10 - Students should possess learning skills that allow them to continue studying in a way that will largely be self-directed or autonomous.
B6	CG1 - Search for and select the useful information needed to solve complex problems, driving fluently bibliographical sources for the field
B7	CG2 - Maintain and extend well-founded theoretical approaches to enable the introduction and exploitation of new and advanced technologies
B8	CG3 - Be able to work in a team, especially of interdisciplinary nature
C1	CT1 - Express oneself correctly, both orally writing, in the official languages of the autonomous community
C4	CT4 - Be able to analyze the real situation, formulate and implement solutions based on knowledge and aimed at the common good and the exercise of open, educated, critical, committed, democratic and solidary citizenship.
C6	CT6 - To assess critically the knowledge, technology and information available to solve the problems they face to.
C8	CT8 - Rating the importance that has the research, innovation and technological development in the socio-economic and cultural progress of society

Learning outcomes			
Learning outcomes	Study programme competences / results		
- Describir a estrutura funcional do sistema nervioso		BJ1 BJ3 BJ5 BJ6 BJ7 BJ8	
Entender os elementos básicos de procesamento neuronal		BJ1 BJ2 BJ3 BJ5 BJ6 BJ8	
Describir as distintas partes da corteza cerebral e as súas funcións asociadas		BJ1 BJ3 BJ5 BJ7	
Entender o funcionamento do sistema nervioso como unha actividade de rede colaborativa	AJ3 AJ4 AJ7	BJ2 BJ4	
Comprender o concepto de plasticidad neuronal		BJ1 BJ3 BJ4 BJ6	
Entender que as alteracións da actividade de rede relaciónanse con distintas patoloxías nerviosas		BJ3 BJ5 BJ7	
Coñecer as distintas aproximacións teóricas e modelos do funcionamento cerebral	AJ7	BJ7 BJ8	CJ6 CJ8
Relacionar a Neurociencia con outras disciplinas e traballar en equipos multiprofesionales	AJ7	BJ6 BJ7 BJ8	CJ1 CJ4



Contents	
Topic	Sub-topic
Introdución á estrutura e función básica do sistema nervioso	Sinapsis Neuronas Circuitos.
Descrición do sistema nervioso como un sistema distribuído	Áreas Integración
Redes neuronais e integración	.
Redes neuronais por defecto.	Fisioloxía Patoloxía
Análise teórica e modelización computacional das funcións do sistema nervioso	Comprender cómo se fai unha modelización. Práctica con neurosimulador. Informe sobre a aplicación do proceso de modelización

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Oral presentation	B3 B4 B6 B7 B8 C1 C4 C6 C8	2	7	9
Workbook	A3 A4 B1 B5 B6 B7	3	3	6
Laboratory practice	A7 B2	7	7	14
Objective test	A7 B2 B7 C4	2	15	17
Guest lecture / keynote speech	A3 B3 B5 B7	7	14	21
Personalized attention		8	0	8

(*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Oral presentation	Intervención inherente aos procesos de ensino-aprendizaxe baseada na exposición verbal a través da que o alumnado e profesorado interactúan dun modo ordenado, propoñendo cuestións, facendo aclaracións e expoñendo temas, traballos, conceptos, feitos ou principios de forma dinámica.
Workbook	Son un conxunto de textos e documentación escrita que se recolleron e editaron como fonte de profundización nos contidos traballados.
Laboratory practice	Metodoloxía que permite que os estudantes aprendan efectivamente a través da realización de actividades de carácter práctico, tales como demostracións, exercicios, experimentos e investigacións.
Objective test	A Proba obxectiva pode combinar distintos tipos de preguntas: preguntas de resposta múltiple, de ordenación, de resposta breve, de discriminación, de completar e/ou de asociación. Tamén se pode construír con un só tipo dalgunha destas preguntas.
Guest lecture / keynote speech	Exposición oral complementada co uso de medios audiovisuais e a introdución de algunhas preguntas dirixidas aos estudantes, coa finalidade de transmitir coñecementos e facilitar a aprendizaxe. A clase maxistral é tamén coñecida como ?conferencia?, ?método expositivo? ou ?lección maxistral?. Esta última modalidade sóese reservar a un tipo especial de lección impartida por un profesor en ocasións especiais, cun contido que supón unha elaboración orixinal e baseada no uso case exclusivo da palabra como vía de transmisión da información á audiencia.

Personalized attention	
Methodologies	Description



Workbook	Atención personalizada virtual (email/Teams)
Oral presentation	
Laboratory practice	O alumno exporá un traballo científico, para a elaboración do mesmo contará co apoio individual do profesor. As prácticas faranse en grupos reducidos onde os alumnos estarán dirixidos polo profesor á hora de realizar algunhas prácticas que doutra forma serían irrealizables e ininteligibles para o alumno.

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Guest lecture / keynote speech	A3 B3 B5 B7	Asistencia e participación	10
Workbook	A3 A4 B1 B5 B6 B7	Participación nas discusións. Comprensión das lecturas	10
Oral presentation	B3 B4 B6 B7 B8 C1 C4 C6 C8	Claridade da exposición Comprensión dos contidos Discurso coherente e ordeado	30
Objective test	A7 B2 B7 C4	Coñecemento da materia	50

Assessment comments

Sources of information	
Basic	<ul style="list-style-type: none"> - Bear, Connors, Paradiso (2016). Neurociencia. La exploración del cerebro . Altamar - Larry Squire (Editor), Darwin Berg (Editor), Floyd E. Bloom (Editor), Sascha du Lac (Editor), Anirva (2012). Fundamental Neuroscience, Fourth Edition . Academic Press - Kandel, E (2012). principles of neural science . McGraw-Hill Education - Hines, M. (1992). "NEURON?A program for simulation of nerve equations?. In: Neural Systems: Analysis and Modeling. p. 127-136. F. Eeckman. Norwell, MA: Kluwer - Hines, M. (1994). "The NEURON simulation program?. In: Neural Network Simulation Environments, p. 147-163.. J. Skrzypek. Norwell, MA: Kluwer - Carnevale, N.T. & Hines, M.L. (1997). "The NEURON simulation environment". 1179-1209.. Neural Computation 9
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
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.