



Teaching Guide

Teaching Guide				
Identifying Data				2017/18
Subject (*)	Neuroengineering and innovation in neuroscience		Code	614522016
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	Optativa	3
Language	SpanishGalician			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias Biomédicas, Medicina e Fisioterapia			
Coordinador		E-mail		
Lecturers	Cudeiro Mazaira, F.Javier Rivadulla Fernandez, Juan Casto		E-mail	javier.cudeiro@udc.es casto.rivadulla@udc.es
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General description	Nesta materia o alumno coñecerá os últimos avances na tecnoloxía de interfaz home-máquina e que tipo de datos son analizados neste tipo de sistemas			

Study programme competences / results

Code	Study programme competences / results
A1	CE1 - Ability to know the scope of Bioinformatics and its most important aspects
A2	CE2 ? To define, evaluate and select the architecture and the most suitable software for solving a problem in the field of bioinformatics
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
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
C3	CT3 - Use the basic tools of the information technology and communications (ICT) necessary for the exercise of their profession and lifelong learning
C6	CT6 - To assess critically the knowledge, technology and information available to solve the problems they face to.
C7	CT7 ? To maintain and establish strategies for scientific updating as a criterion for professional improvement.
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		
Conocer los distintas técnicas de estimulación cerebral no invasiva y su aplicación Neurociencia y ser capaz de valorar críticamente sus contribuciones y limitaciones	AJ1 AJ7	BJ1 BJ5 BJ8	CJ1
- Comprender el funcionamiento del cerebro bajo la orientación de buscar alternativas para su exploración y estimulación.	AJ3	BJ6 BJ7	
- Entender el funcionamiento de los Interfaces avanzados, Cerebro-Computador; Fundamentos, etapas, aplicaciones.	AJ1 AJ2 AJ3 AJ7	BJ1 BJ2 BJ3 BJ4	CJ3 CJ7
- Comprender estrategias de ayuda a los sentidos y al movimiento mediante la estimulación cerebral utilizando soluciones integradas de ingeniería.	AJ1 AJ7	BJ2 BJ4	CJ6 CJ8
- Caracterización de patrones y eventos asociados a cambios de estado en el cerebro.	AJ2 AJ7		CJ1 CJ6 CJ7
- Comprender y saber explotar soluciones integradoras de la ingeniería en el ámbito neurológico con el fin de mejorar las actividades de la vida diaria en colectivos dependientes	AJ3	BJ3 BJ4	CJ7

Contents	
Topic	Sub-topic
Tema 1	Una ventana al cerebro: Nuevas Tecnologías en la exploración y estimulación cerebral.
Tema 2	Interfaces Hombre-Máquina (Brain-Computer). Procesos, caracterización, evaluación de variables, reconocimiento de patrones, aprendizaje.
Tema 3	NeuroIngeniería, prótesis e interfaces hombre-máquina: ayudando al movimiento y a los sentidos
Tema 4	Análisis Para la detección de cambios de estado del cerebro: predic-ción de eventos.

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Problem solving	A3 B1 B3 B5 B6 B8 C6 C3	8	16	24
Oral presentation	A1 B5 B4 B1 C1 C3 C6 C7 C8	2	10	12
Events academic / information	A1 A7 B3 B4	2	2	4
Objective test	A3 A1 B4 B2 B1 C1	2	16	18
Guest lecture / keynote speech	A1 A2 A3 A7 B7 B2 B1 C6	7	7	14
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
Problem solving	Técnica mediante a que se ten que resolver unha situación problemática concreta, a partir dos coñecementos que se traballaron, que pode ter máis dunha posible solución.



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.
Events academic / information	Actividades realizadas polo alumnado que implican a asistencia e/ou participación en eventos científicos e/ou divulgativos (congresos, xornadas, simposios, cursos, seminarios, conferencias, exposicións, etc.) co obxectivo de profundar no coñecemento de temas de estudo relacionados coa materia. Estas actividades proporcionan ao alumnado coñecementos e experiencias actuais que incorporan as últimas novidades referentes a un determinado ámbito de estudo.
Objective test	Examen sobre os contidos da materia
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 sóse 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
Oral presentation	O estudante terá apoio a través de titorías personalizadas durante o proceso de preparación da exposición

Assessment			
Methodologies	Competencies / Results	Description	Qualification
Oral presentation	A1 B5 B4 B1 C1 C3 C6 C7 C8	Grado de elaboración da proposta Claridade expositiva Capacidade de reflexión	20
Guest lecture / keynote speech	A1 A2 A3 A7 B7 B2 B1 C6	Asistencia e participación	10
Problem solving	A3 B1 B3 B5 B6 B8 C6 C3	Participación na aula Entrega de cuadernillo	20
Objective test	A3 A1 B4 B2 B1 C1	Avaliación dos coñecementos	50

Assessment comments

Sources of information	
Basic	
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.