IDENTIFYING DATA

Information systems in biomedical environments

Subject	Information systems in biomedical environments
Code	V12G420V01917
Study programme	Grado en Ingeniería Biomédica

Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	2nd

Teaching language	#EnglishFriendly Spanish
Department	
Coordinator	Rodríguez Diéguez, Amador
Lecturers	Rodríguez Diéguez, Amador
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General description	This subject shows how to manage information by means of databases, as well as its analysis using automatic learning techniques. Special attention will be payed biomedical uses and standards. English Friendly subject: International students may request from the teachers: a) resources and bibliographic references in English b) tutoring sessions in English c) exams and assessments in English.

Training and Learning Results

Code	
A5	That students have developed those learning skills needed to undertake further studies with a high degree of autonomy.
B1	CG4 Ability to solve problems with initiative and to visualize, communicate and transmit knowledge, skills and abilities in the field of biomedical engineering.
C3	CE3 Basic knowledge on the use and programming of computers, operating systems, databases and software applications in engineering.
C35	CE35 Carry out measurements and interpret data from living systems.
D5	CT5 Information Management.
D6	CT6 Application of computer science in the field of study.

Expected results from this subject

Expected results from this subject	Training and Learning Results			
New			C3	D5
				D6
New		B1	C3	D5
New	A5		C3	D5
				D6
New			C3	D5
			C35	
New	A5	B1	C3	D5
			C35	D6

Contents

Topic

1.- INFORMATION SYSTEMS	1.1.- Basic concepts
	1.2.- DataBase Management System
	1.3.- Design of relational databases
	1.4.- Creation of the database
	1.5.- Management of the information with SQL
	1.6.- Exchange of information
2.- DATA ANALYSIS	2.1.- Data preparation
	2.2.- Python for data preparation
	2.2.- Machine learning
	2.3.- Scipy
	2.4.- Scikit-learn
	2.5.- Deep Learning
	2.6.- Big Data
3.- BIOMEDICAL INFORMATION	3.1.- Introduction to biomedical information
	3.2.- Hospital information system (HIS)
	3.3.- Standards for exchange of medical information
	3.4.- Traceability of biomedical information

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	22	22	44
Problem solving	10	15	25
Autonomous problem solving	0	32	32
Laboratory practical	18	20	38
Essay questions exam	3	0	3
Project	0	4	4
Project	0	4	4

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

Methodologies

	Description
	Description
Lecturing	Presentation of contents by the instructor
Problem solving	The instructor will solve problems in order to suplement and reinforce the concepts introduced in the theory presentations.
Autonomous problem solving	The student will solve problems on his own in order to reinforce the concepts learnt both in the classroom and in the laboratory. It will also help him identify the concepts that still needs extra work to be able to reach the minimum level.
Laboratory practical	Activities to apply the adquired knowledge to more concrete an realistic situations. It will follow an integrative approach.

Personalized assistance

Methodologies	Description
Lecturing	The instructor will solve any douts and questions in person. This assistance will take place during the lectures, the problem sessions and the lab sessions. Office hours are also available by setting an appointment in advance. Multiple digital means of communication can be used to get assistance: email, video-conference, forums, etc.
Problem solving	The instructor will solve any douts and questions in person. This assistance will take place during the lectures, the problem sessions and the lab sessions. Office hours are also available by setting an appointment in advance. Multiple digital means of communication can be used to get assistance: email, video-conference, forums, etc.
Autonomous problem solving	The instructor will solve any douts and questions in person. This assistance will take place during the lectures, the problem sessions and the lab sessions. Office hours are also available by setting an appointment in advance. Multiple digital means of communication can be used to get assistance: email, video-conference, forums, etc.
Laboratory practical	The instructor will solve any douts and questions in person. This assistance will take place during the lectures, the problem sessions and the lab sessions. Office hours are also available by setting an appointment in advance. Multiple digital means of communication can be used to get assistance: email, video-conference, forums, etc.

Tests	Description
Project	
Project	

Assessment

	Description	Qualification	Training and Learning Results		
Essay questions exam	Examination that can include problems, exercises, essay question and multiple choice questions. Grades will be based on a scale of 0 to 10.	25	A5	C3	D5 D6
Project	Short project to put intop analysis and data preparation techniques.	35	A5	B1	D5 D6
Project	Short project to put into practice machine learning techniques.	40	A5	B1	D5 D6

Other comments on the Evaluation

The student must get at least 5 points out of 10 in the written exam and in each project. In case the student fails the written exam, he or she will have the opportunity to retake it at the second call. Similarly, any failed project, can be submitted again for the second call. The projects will be the same for both calls.

Ethical commitment: Students are expected to behave ethically. If unethical behaviour is detected (cheating, copying, plagiarism, use of unauthorized electronic devices and others), then it will be considered that the student does not meet the minimum requirements to pass the course. In this case, the final grade for the current academic year will be failed (0.0).

Sources of information
Basic Bibliography
Complementary Bibliography
Aurélien Géron, **Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow**, 2, O'Reilly, 2019
Daniel Burrueco, **https://interactivechaos.com**,
Carme Martín Escofet,
http://openaccess.uoc.edu/webapps/o2/bitstream/10609/69205/3/Bases%20de%20datos_M%C3%B3dulo%203_El%20lenguaje%20SQL.pdf, Universitat Oberta de Catalunya, 2013
https://digitalguardian.com/blog/what-health-information-system, Digital Guardian,
https://www.caduceus.es/estandares-interoperabilidad-salud/, Caduceus Software SL,
https://www.dcvmn.org/IMG/pdf/traceability_in_healthcare.pdf, Developing Countries Vaccine Manufacturers Network,

Recommendations

Subjects that it is recommended to have taken before
Computer Science: computer science for engineering/V12G420V01203