UNIVERSIDAD DE CASTILLA - LA MANCHA

GUÍA DOCENTE

1. General information

Course: BIOINFORMATICS AND BIG DATA
Code: 60622
Type: CORE COURSE
ECTS credits: 6
Degree: 402 - UNDERGRADUATE DEGREE PROGRAMME IN BIOTECHNOLOGY
Academic year: 2023-24
Center: 601 - E.T.S. AGRICULTURAL ENGINEERS AND MOUNTS AB
Group(s): 10
Year: 3
Duration: First semester
Main language: Spanish
Second language:
Use of additional languages:
English Friendly: Y
Web site:
Bilingual: N

Lecturer: **LUIS DE LA OSSA JIMENEZ** - Group(s): **10**

Building/Office	Department	Phone number	Email	Office hours
ESII / 0.A.12	SISTEMAS INFORMÁTICOS	2413	luis.delaossa@uclm.es	

2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

Not established

4. Degree competences achieved in this course

Course competences

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB04	Transmit information, ideas, problems and solutions for both specialist and non-specialist audiences.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CE14	Know the handling of biological, biochemical and genetic databases.
CG01	Organizational and planning skills.
CG02	Capacity for analysis and synthesis.
CG03	Ability to work in multidisciplinary teams collaboratively and with shared responsibility.
CT01	Know a second foreign language.
CT02	Know and apply the Information and Communication Technologies.
CT03	Use correct oral and written communication.
CT04	Know the ethical commitment and professional deontology.

5. Objectives or Learning Outcomes

Course learning outcomes

Description

Additional outcomes

6. Units / Contents

Unit 1:
Unit 2:
- **Unit 2.1**
- **Unit 2.2**
- **Unit 2.3**
- **Unit 2.4**

Unit 3:
- **Unit 3.1**
- **Unit 3.2**
- **Unit 3.3**

Unit 4:
- **Unit 4.1**
- **Unit 4.2**
- **Unit 4.3**

Unit 4.4
Unit 4.5
Unit 5:
Unit 5.1
Unit 5.2
Unit 5.3
Unit 5.4
Unit 6:
Unit 6.1
Unit 6.2
Unit 6.3

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB02 CE14 CT02	1	25	N	-	
Class Attendance (practical) [ON-SITE]	Problem solving and exercises	CB02 CB03 CB05 CE14 CT02	0.6	15	N	-	
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB01 CB02 CB03 CB04 CB05 CE14 CG01 CG03 CT01 CT02	0.4	10	N	-	
Practicum and practical activities report writing or preparation [OFF-SITE]	Guided or supervised work	CB01 CB02 CB03 CB04 CB05 CE14 CG01 CG02 CG03 CT01 CT02 CT03 CT04	1	25	Y	Y	
Formative Assessment [ON-SITE]	Assessment tests	CB01 CB03 CE14 CG02 CT03	0.16	4	Y	Y	
Group tutoring sessions [ON-SITE]	Group tutoring sessions	CB04 CT04	0.04	1	N	-	
Study and Exam Preparation [OFF-SITE]	Self-study	CB02 CB03 CB05 CE14 CG01 CG02	2.6	65	N	-	
Project or Topic Presentations [ON-SITE]	Individual presentation of projects and reports	CB02 CB03 CB04 CB05 CG02 CG03 CT02 CT03 CT04	0.2	5	Y	N	
		Total:	**6**	**150**			
		Total credits of in-class work: 2.4					**Total class time hours: 60**
		Total credits of out of class work: 3.6					**Total hours of out of class work: 90**

As: Assessable training activity
Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Test	65.00%	65.00%	
Practicum and practical activities reports assessment	10.00%	10.00%	
Practical exam	25.00%	25.00%	
Total:	**100.00%**	**100.00%**	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject , an ordinary and an extraordinary one (evaluating 100% of the competences).

9. Assignments, course calendar and important dates

Not related to the syllabus/contents	
Hours	**hours**
Formative Assessment [PRESENCIAL][Assessment tests]	4
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Unit 1 (de 6):	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 2 (de 6):	
Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	5
Unit 3 (de 6):	
Activities	**Hours**

Class Attendance (theory) [PRESENCIAL][Lectures]	2
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	5

Unit 4 (de 6):

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	6
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	5

Unit 5 (de 6):

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	5

Unit 6 (de 6):

Activities	**Hours**
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	4
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	2
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	5

Global activity

Activities	**hours**
Class Attendance (practical) [PRESENCIAL][Problem solving and exercises]	20
Class Attendance (theory) [PRESENCIAL][Lectures]	25
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	10
Formative Assessment [PRESENCIAL][Assessment tests]	4
Group tutoring sessions [PRESENCIAL][Group tutoring sessions]	1
Practicum and practical activities report writing or preparation [AUTÓNOMA][Guided or supervised work]	25
Study and Exam Preparation [AUTÓNOMA][Self-study]	65
Total horas:	150

10. Bibliography and Sources

Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Miguel Rocha, Pedro G. Ferreira	Bioinformatics Algorithms. Design and Implementation in Python	Elsevier		978-0-12-812520-5	2018	
Jake VanderPlas	Python Data Science Handbook	O'Reilly Media, Inc.		9781491912058	2016	
	https://jakevdp.github.io/PythonDataScienceHandbook/					
Ravishankar Chityala	Image Processing and Acquisition using Python	Chapman & Hall/CRC		978-1466583757		
Tim J. Stevens, Wayne Boucher	Python Programming for Biology: Bioinformatics and Beyond	Cambridge University Press		978-0521720090	2015	
	Documentación de Pandas http://pandas.pydata.org/					
	Documentación Matplotlib http://matplotlib.org/					
	Introducción a la programación con Python https://www.u-cursos.cl/ingenieria/2011/2/CC3501/1/material_docente/bajar?id_material=381752					
William W. Cohen	A Computer Scientists Guide to Cell Biology	Springer		978-0-387-48275-0	2007	
Sebastian Bassi	Python for Bioinformatics	(Chapman & Hall/CRC Computational Biology Series)		978-1138035263	2018	
Phillip Compeau, Pavel Pevzner	Bioinformatics Algorithms	Active Learning Publishers		978-0990374633	2018	
	https://www.bioinformaticsalgorithms.org/					