

# ANX-PR/CL/001-01

## LEARNING GUIDE

### SUBJECT

**103000836 - Data Management And Knowledge In Health**

### DEGREE PROGRAMME

10AX - Master Universitario Innovación Digital Ciencia de Datos Itinerario Health

### ACADEMIC YEAR & SEMESTER

2020/21 - Semester 1

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## 1. Description

### 1.1. Subject details

<b>Name of the subject</b>	103000836 - Data Management And Knowledge In Health
<b>No of credits</b>	4 ECTS
<b>Type</b>	Optional
<b>Academic year of the programme</b>	Second year
<b>Semester of tuition</b>	Semester 3
<b>Tuition period</b>	September-January
<b>Tuition languages</b>	English
<b>Degree programme</b>	10AX - Master Universitario Innovación Digital Ciencia de Datos Itinerario Health
<b>Centre</b>	10 - Escuela Técnica Superior de Ingenieros Informáticos
<b>Academic year</b>	2020-21

## 2. Faculty

### 2.1. Faculty members with subject teaching role

<b>Name and surname</b>	<b>Office/Room</b>	<b>Email</b>	<b>Tutoring hours *</b>
Jose Crespo Del Arco	2311	jose.crespo@upm.es	Th - 14:00 - 20:00
Miguel Garcia Remesal		miguel.garcia.remesal@upm.es	Sin horario.
Victor Manuel Maojo Garcia (Subject coordinator)	2102	victormanuel.maojo@upm.es	Tu - 11:00 - 14:00 W - 11:00 - 14:00

David Perez Del Rey	2104	david.perez.rey@upm.es	M - 11:00 - 14:00 Th - 13:00 - 14:00
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\* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

## 2.2. Research assistants

Name and surname	Email	Faculty member in charge
Paraiso Medina, Sergio	sergio.paraiso@upm.es	Maojo Garcia, Victor Manuel

## 2.3. External faculty

Name and surname	Email	Institution
Sergio Paraiso	sergio.paraiso@upm.es	ETSIII
Raul Alonso Calvo	ralonso@infomed.dia.fi.upm.es	ETSII

## 3. Skills and learning outcomes \*

### 3.1. Skills to be learned

CB10 - Que los estudiantes posean las habilidades de aprendizaje que les permitan continuar estudiando de un modo que habrá de ser en gran medida autodirigido o autónomo.

CE-EIT01 - Capacidad para seguir y aplicar los procesos y actividades del emprendimiento para lanzar un empresa de base tecnológica basada en actividades previas de I+D e identificar diferentes fuentes de financiación de emprendimiento e innovación, y seleccionar la más apropiada para el modelo de negocio y la tecnología consideradas.

CE-HMDA06 - Capacidad para extraer, integrar y consultar datos heterogéneos en escenarios clínicos

CE-HMDA07 - Capacidad para diseñar y gestionar proyectos de salud y datos médicos

CE-HMDA09 - Capacidad para solventar problemas reales en el área clínica seleccionando la mejor de las técnicas posibles

## 3.2. Learning outcomes

RA17 - Apply methods for knowledge acquisition to create knowledge bases using other sources of information

RA29 - Deal with unstructured health data

RA30 - Extract and manipulate data from public sources

RA34 - Understand and apply information retrieval systems

\* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

## 4. Brief description of the subject and syllabus

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### 4.1. Brief description of the subject

Biomedical informatics is a scientific discipline created in the 60s with the intention of improving the management of data, information and knowledge in the biomedical area. Achievements include the creation of decision support systems, electronic medical records, omic projects, hospital information systems, terminologies and other projects of similar importance. The creation of the so-called digital medicine and precision medicine are the latest advances in this direction, seeking ubiquitous computing, with the goal of improving the health of the citizen. There will be a survey of bioinformatics techniques, from a practical perspective.

The management of data and knowledge in health has its own characteristics. The design of the studies and the evaluation of the results, for example, are completely different from those that are necessary in other multiple areas.

## 4.2. Syllabus

1. Introduction to the course
2. Data, information and knowledge: concepts and foundations
3. Data integration: techniques and concepts
4. Electronic health records and departmental systems
5. Artificial Intelligence in Biomedicine
6. Data and text mining
7. Bioinformatics: basis concepts and techniques

## 5. Schedule

### 5.1. Subject schedule\*

Week	Face-to-face classroom activities	Face-to-face laboratory activities	Distant / On-line	Assessment activities
1	<b>Introduction</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
2	<b>Data, information and knowledge in biomedicine</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
3	<b>Research design for studies in biomedicine</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
4	<b>Artificial intelligence in biomedicine: medical reasoning and foundations</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
5	<b>Artificial intelligence in biomedicine: medical decision support</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
6	<b>Biomedical vocabularies and standards I</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
7	<b>Biomedical vocabularies and standards II</b> Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	

8	Electronic Health Records and Hospital Information Systems I Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
9	Presentation of assignments Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	Presentation of assignment Continuous assessment Presential Duration: 00:00
10	Electronic Health Records and Hospital Information Systems II Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
11	Integration and interoperability for health data and knowledge sources I Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
12	Integration and interoperability for health data and knowledge sources II Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
13	Bioinformatics applications in biomedicine. Techniques and applications for data sequence processing and analysis. Sequence alignment. Clinical applications Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	
14	Presentation of assignments Duration: 02:00		Use of distance learning may be necessary due to the pandemic. Instructions will be provided by the university Duration: 00:00	Presentation of second assignment Continuous assessment Presential Duration: 00:00
15				
16				An assignment that will include topics from the two regular assignments Final examination Not Presential Duration: 00:00
17				

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

\* The schedule is based on an a priori planning of the subject; it might be modified during the academic year, especially considering the COVID19 evolution.



## 6. Activities and assessment criteria

### 6.1. Assessment activities

#### 6.1.1. Continuous assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
9	Presentation of assignment		Face-to-face	00:00	50%	3 / 10	CE-EIT01 CE-HMDA06 CB10 CE-HMDA09 CE-HMDA07
14	Presentation of second assignment		Face-to-face	00:00	50%	3 / 10	CE-HMDA07 CE-EIT01 CE-HMDA06 CB10 CE-HMDA09

#### 6.1.2. Final examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
16	An assignment that will include topics from the two regular assignments		No Presential	00:00	100%	5 / 10	CE-HMDA06 CE-HMDA07 CE-EIT01 CB10 CE-HMDA09

#### 6.1.3. Referred (re-sit) examination

No se ha definido la evaluación extraordinaria.

## 6.2. Assessment criteria

Presentations of assignment, online and (to be decided according to the pandemic context) in groups of 2-3 students

## 7. Teaching resources

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### 7.1. Teaching resources for the subject

Name	Type	Notes
PUBmed and its resources (NCBI, for instance=I	Web resource	Different bibliographic and research databases
Biomedical Informatics books	Bibliography	Available at the website of the American Medical Informatics Association
Journals available within the UPM network	Bibliography	papers from the Journal of biomedical informatics, Journal of the American Medical Informatics Association, International Journal of Medical Informatics. All of them available over the Internet
Dispositivos para teleenseñanza (ordenador, tablet, móvil)	Equipment	For online lecturing and teaching

## 8. Other information

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### 8.1. Other information about the subject

We will emphasize from practical use of the tools and techniques explained in the course.