COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001

INTERNATIONAL
CAMPUS OF
EXCELLENCE

POLITÉCNICA

E.T.S. de Ingenieros
Informaticos

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

103000855 - Data Science Seminars

DEGREE PROGRAMME

10AZ - Master Universitario En Innovación Digital

ACADEMIC YEAR & SEMESTER

2024/25 - Semester 2

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Learning guide

1. Description

1.1. Subject details

Name of the subject	103000855 - Data Science Seminars
No of credits	4.5 ECTS
Type	Optional
Academic year ot the programme	First year
Semester of tuition	Semester 2
Tuition period	February-June
Tuition languages	English
Degree programme	10AZ - Master Universitario en Innovación Digital
Centre	10 - Escuela Tecnica Superior De Ingenieros Informaticos
Academic year	2024-25

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Francisco Javier Soriano Camino (Subject coordinator)	4309	javier.soriano@upm.es	M - 15:00 - 21:00 Please send an email to prof. Soriano to arrange a specific appointment and avoid unnecessary waits.

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Alejandro Rodriguez Gonzalez		alejandro.rg@upm.es	M - 09:00 - 15:00
Roberto San Jose Garcia		roberto.sanjose@upm.es	M - 09:00 - 15:00
Ernestina Menasalvas Ruiz		ernestina.menasalvas@upm.es	M - 09:00 - 15:00

* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

The subject - recommended (passed), are not defined.

3.2. Other recommended learning outcomes

- According to general prerequisites for ICT KIC master programs this is the first course for enrolled students in the DS Master Degree. Students should have finished their Degree Project and should have also participated in the Initial Week.

4. Skills and learning outcomes *

4.1. Skills to be learned

CB06 - Poseer y comprender conocimientos que aporten una base u oportunidad de ser originales en el desarrollo y/o aplicación de ideas, a menudo en un contexto de investigación

CG03 - La capacidad de usar la lengua inglesa de manera competente, es decir, con capacitación para tareas complejas de trabajo y estudio.

4.2. Learning outcomes

RA17 - Acquire specialized knowledge from innovative fields of studies

RA16 - Understand the relevance of continuing education

RA14 - Apply the acquired knowledge in real contexts

* 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.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

The module is configured around a series of seminars that address the challenges and opportunities emerging from large quantities of heterogeneous, complex, networked and dynamic data influencing virtually all socio-economic domains.

Main themes to be covered by the seminars (not exhaustive):

- Big Data in the medical domain: EHR and image mining
- Neuroscience focus on Big Data
- Data Management in Biomedicine
- Large-scale Biomedical Text Mining
- Feature Extraction in Images
- Data-intensive Workflows in the Scientific Domain
- Data Science in Environmental Research and Applications
- Big Data for Computer Security
- Big Data in the Publicity domain
- Big Data Management and Analytics in the Banking domain

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- Big Data Analytics in the Games Industry
- Big Data Analytics for Smart Cities
- Visualizing large datasets in the Semantic Web
- Ontology-based Data Integration
- Atmospheric Science Modelling Systems
- Big Data Visualization
- IoT Mining

The topics covered by the seminars will suffer from small variations yearly, amongst those in the above list or other considered relevant to the subject.

Substantial part of the contents will be based on the interest of students based on case studies, examples and specificities of this DS master course.

The seminars will promote discussions with professionals and experts from renowned ICT companies and research centers. They will also plan visits to some of their premises, including Cajal Lab for Cortical Circuits at the Biomedical Technology Center, IMDEA Software, Madrid Supercomputing and Visualization Center CESVIMA, etc.

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5.2. Syllabus

1. Data Science Seminars

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6. Schedule

6.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	**Data Science Seminar** Duration: 04:00 Additional activities			
2	**Data Science Seminar** Duration: 04:00 Additional activities			
3	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
4	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
5				**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
6	**Data Science Seminar** Duration: 04:00 Additional activities			
7	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
8	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
9				**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
10	**Data Science Seminar** Duration: 04:00 Additional activities			

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11	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
12				
13	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
14				**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
15	**Data Science Seminar** Duration: 04:00 Additional activities			**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
16				**Assignment** Individual work Progressive assessment Not Presential Duration: 00:00
17				**Assessment** Other assessment Global examination Presential Duration: 02:00

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.

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7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
3	Assignment	Individual work	No Presential	00:00	9%	/ 10	CB06 CG03
4	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
5	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
7	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
8	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
9	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
11	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
13	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
14	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
15	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03
16	Assignment	Individual work	No Presential	00:00	9.1%	/ 10	CB06 CG03

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
17	Assessment	Other assessment	Face-to-face	02:00	100%	5 / 10	CG03 CB06

7.1.3. Referred (re-sit) examination

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Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Assessment	Other assessment	Face-to-face	02:00	100%	5 / 10	CB06 CG03

7.2. Assessment criteria

Assessment and Grading Procedures

The evaluation of the students will be based on three main sources:

- Continuous evaluation: activities during lectures (classroom interactivity, short tests, etc.)
- Presentation of individual work (Analysis of case studies)
- Written exam (basic concepts understanding)

The student is responsible for enrolling and passing a number of seminars that sum 4,5 or more ECTS, with a grade greater than or equal to 5/10 in each seminar.Workload calculation (contact hours, homework, exam preparation, etc.). The final grade will be calculated as the weighted average of the best grades obtained in enrolled seminars that sum 4,5 ECTS.

The extra examination call will consist in the realization of a number of work assignments proposed specifically for the call that allow him to pass 4,5 ECTS or more (seminars with a grade equal to or higher than 5 in the ordinary/continuous examination call will count). The work assignments in this call could differ from the ones proposed in the continuous evaluation process. The student is responsible for carrying out and submitting for evaluation the work assignments proposed in a number of seminars that let him pass a number of seminars that sum 4,5 or more ECTS.

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8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Slides used in the lectures	Others	Slides used in the lectures
Selected bibliography recommended by the seminar supervisor	Bibliography	Selected bibliography recommended by the seminar supervisor
References of relevant case studies	Web resource	References of relevant case studies

9. Other information

9.1. Other information about the subject

Teaching and learning methods:

The module is organized around a set of seminars that will explain the whole lifecycle of Big Data-based projects in different business and scientific areas. In these seminars, experts from companies, government institutions, research centers and academia will shed light on the opportunities and challenges in Data Science in the coming years, and discuss how to address the challenges and optimally exploit the opportunities related to big data.

The teaching and learning approach include:

- Formal lecturesDiscussion
- Individual learning
- Individual or team working assignments focused on case studies
- Preparation of individual or group presentations
- Evaluation of knowledge and competence acquisition through exams, homework assignments or classroom participation

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- Guided visits to the premises of some partners (IMDEA Software, CESVIMA, CTB, etc.)

ECTS distribution (4,5 ECTS):

Each seminar will be responsible of teaching and evaluating 0,5 or 1 ECTS

The student is responsible for enrolling and passing a number of seminars that sum 4,5 or more ECTS, with a grade greater than or equal to 5/10 in each seminar.

Workload calculation:

Each seminar will be responsible of teaching and evaluating 0,5 or 1 ECTS (i.e. 13,5 / 27 hours of workload) with the following workload distribution (considering 0,5 ECTS per seminar):

- 4-6 hours lecturing
- 3-4 hours for individual work (could include 2 hours for guided visits)
- 4 hours for exam preparation (including materials for presentation and/or assignment deliverables)
- Personal tuition will be offered to students or teams (average 1,5 hour)

Frequency and dates:

This course will be organised during the second semester of the 1st year.

4 - 5,5 contact hours (lecturing, personal tuition) per week, in alternate weeks.

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Max. number of participants:

The course is limited to a maximum of 30 students

Enrollment procedure:

Enrollment is not independent of the general enrollment process of the DS master.

The course is a mandatory unit of the first year major. All students in the DS master diploma must cover it.

Other information:

The module will have an entry in the UPM e-learning platform (Moodle), which will be made available to students.

Access to documents included in the ICT-Labs Master School web site will be also made available to students.

UPM bibliographic funds and reference tools will be available for students.

Note regarding Covid-19:

The health crisis caused by the COVID-19 pandemic has led to the decision that the teaching of this semester is planned in adapted face-to-face mode, which will combine live online teaching ("online teaching" column of the schedule) with online assignments.

If sanitary conditions improve and face-to-face classes can be taught normally, column "classroom activity" will

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apply.

If, on the other hand, the sanitary conditions worsen, planned activities will be carried out online, without the need to modify this guide.