

**COURSE DATA****Data Subject**

Code	36414
Name	Data, science and society
Cycle	Grade
ECTS Credits	6.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. Period
1406 - Degree in Data Science	School of Engineering	1 First term

Subject-matter

Degree	Subject-matter	Character
1406 - Degree in Data Science	4 - Data and Society	Basic Training

Coordination

Name	Department
SERRANO LOPEZ, ANTONIO JOSE	242 - Electronic Engineering

SUMMARY

Data, Science and Society is a subject of the first course of the Degree in Data Science of the University of Valencia. Its main objective is to introduce the most important concepts of Data Science that will be developed in detail throughout the degree. It will deal with the profession of Data Scientist and the revolution that is taking place in fields such as economics, industry and research as a result of the exploitation of the data generated by an increasingly digitalised world. Issues such as the legal and ethical implications and the progress it will bring to society will also be addressed.

Theory lessons will be taught in Spanish and practical and laboratory lessons as according to the information sheet available on the web page of the degree



PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

No requirements

OUTCOMES

1406 - Degree in Data Science

- (CG01) Knowledge of basic subjects and technologies that enable students to learn new methods and technologies, and to provide them with versatility to adapt to new situations.
- (CG02) Ability to solve problems with initiative and creativity and to communicate and transmit knowledge, abilities and skills, which should include the ethical and professional responsibility of the activity of a data scientist.
- (CG04) Ability to work in a multidisciplinary group in a multilingual environment and to communicate, orally and in writing, knowledge, procedures, results and ideas related to data science.
- (CT01) To be able to access (bibliographical) information tools and appropriately use them in the development of their daily tasks.
- (CT02) To be able to complete technical, scientific, social and human training in general, and to organise self-learning with a high degree of autonomy.
- (CE05) To understand the most relevant fields of application of data science and understand how data science is used to base and perform decision-making based on data
- (CE14) To understand and apply the ethical, legal and normative aspects related to data treatment and the application of the obtained knowledge.
- (CB1) Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.
- (CB3) Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

LEARNING OUTCOMES

To know the scope of application of data science and the different techniques/approaches that exist for it.

To know the elements/stages that make up a data analysis.



To know the libraries/programs of the most widespread languages for data processing.

To know the concept of reproducibility in Data Science

DESCRIPTION OF CONTENTS

1. Degree in Data Science

Introduction to Data Science
Degree in Data Science Curriculum
Structure, organisation and services of the University
ETSEUV, Virtual Classroom, timetable, exam calendar.

2. Data Scientist

Data Scientist: Competences
Data Science Languages: SQL, R and Python
Major Programs in Data Science
Professional profiles and areas of activity.

3. Data

Types and characteristics
Data sources
Data quality

4. Stages in Data Science

Extract, Transform and Load
Exploratory Analysis
Segmentation, Grouping
Modelling, Forecasting, Classification
Knowledge extraction and decision making

5. Automatic learning

Machine learning
Supervised, unsupervised and reinforced learning
Operating measures
Learning difficulties

**6. Data and Society**

Reproducible Research

Biased models and ethical implications

Legislation

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	42,00	100
Laboratory practices	10,00	100
Classroom practices	8,00	100
Development of group work	10,00	0
Development of individual work	6,00	0
Study and independent work	23,00	0
Readings supplementary material	6,00	0
Preparation of evaluation activities	20,00	0
Preparing lectures	8,00	0
Preparation of practical classes and problem	6,00	0
Resolution of case studies	5,00	0
Resolution of online questionnaires	6,00	0
TOTAL	150,00	

TEACHING METHODOLOGY

Classes will combine theoretical and practical content:

MD1 - Theoretical activities. Development of expository of the matter with the participation of the student in the resolution of specific questions. Conducting individual evaluation questionnaires.

In the theoretical activities of a face-to-face nature, the subjects of the course will be developed, providing a global and integrating vision, analysing in greater detail the key aspects and of greater complexity, encouraging, at all times, the participation of students.

MD2 - Practical activities. Learning through problem solving, exercises and case studies through which skills are acquired in the different aspects of the subject.

Theoretical activities are complemented by practical activities with the aim of applying the basic concepts and extending them with the knowledge and experience acquired during the performance of the proposed work.



MD4 -Laboratory and/or computer classroom work. Learning through activities developed individually or in small groups and carried out in laboratories and/or computer rooms.

In addition to face-to-face activities, students will be required to do personal homework (outside the classroom) on: issues and problems, as well as preparing for classes and exams (study). These tasks will be carried out mainly on an individual basis, in order to encourage autonomous work, but will also include work, especially the preparation and resolution of laboratory practices, which require the participation of small groups of students (2-3) to foster the capacity for integration into work groups.

EVALUATION

The learning of the knowledge and competences achieved by students will be continuously evaluated throughout the course, and will consist of the following evaluation blocks:

SE1 - Objective test, consisting of one or more examinations with both theoretical and practical questions and problems (50%) (Note: All percentages refer to the final grade)

- SE1-1 (35%) Theory examination
- SE1-2 (15%) Laboratory examination

SE2 - Evaluation of practical activities based on the preparation of papers/memories and/or oral presentations (30%)

- SE2-1 (15%) Implementation of a mini-project consisting of an introduction to the Data Science stages.
- SE2-2 (15%) Laboratory lessons

SE3 - Continuous assessment of each student, based on the participation and degree of involvement of the student in the teaching-learning process, taking into account the regular attendance to the planned face-to-face activities and the resolution of issues and problems proposed periodically. (20%)

- SE3-1 (5%) Regular attendance at planned face-to-face activities. (NON-recoverable activity)
- SE3-2 (15%) Resolution of proposed issues and problems. (NON-recoverable activity)

The final grade of the course will be calculated as the weighted average of each of the previous sections, according to the following criteria: SE-1 (50%), SE-2 (30%), SE-3 (20%).

Particular considerations about the evaluation:

- A minimum score of 4 (out of 10) is required in the evaluation sections SE1-1, SE1-2 and SE2-1.
- The SE3-1 and SE3-2 activities are not recoverable.

In any case, the evaluation system will be governed by the provisions of the Evaluation and Qualification Regulations of the University of Valencia for Degrees and Masters:



(<https://webges.uv.es/uvTaeWeb/MuestraInformacionEdictoPublicoFrontAction.do?accion=start&idEdictoSelected=5639>)

REFERENCES

Basic

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- C. Aggarwal (2015) Data mining: the textbook. Springer
<https://link.springer.com/book/10.1007%2F978-3-319-14142-8>
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- Evaluating Machine Learning Models. https://www.oreilly.com/data/free/evaluating-machine-learning-models.csp?intcmp=il-data-free-lp-lgen_free_reports_page
- R.K. Pearson (2018) Exploratory Data Analysis Using R. CRC.

Additional

- Data Science for manufacturing. https://www.safaribooksonline.com/library/view/data-science-for/9781492042686/?intcmp=il-data-free-lp-lgen_free_reports_page
- A. Cirillo (2017) R Data Mining. Pack Publishing
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