

**COURSE DATA****DATA SUBJECT****Code:** 36424**Name:** Data management**Cycle:** Undergraduate Studies**ECTS Credits:** 6**Academic year:** 2026-27**STUDY (S)**

Degree	Center	Acad. year	Period
1406 - Degree in Data Science	Escola Tècnica Superior d'Enginyeria	2	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1406 - Degree in Data Science	Information Management	COMPULSORY

COORDINATION

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VES CUENCA ESTHER DE

SUMMARY

Data Management is a component of the Information Management track. Comprising 6 ECTS credits, it is taught in the first semester of the second year of the Degree in Data Science.

The volume of data generated, stored and processed today is growing exponentially. Although relational databases have demonstrated their ability to adapt to growing needs, traditional database architectures and models can sometimes be insufficient or inadequate for addressing the volume and type of data to be managed.

This course deals with new architectures for parallel and distributed databases, new models of databases generally known as NoSQL, and tools and techniques for data warehousing and multidimensional data models. It also presents an overview of data integration and migration processes.

Students will acquire the ability to analyze the advantages and disadvantages of various technologies in order to select the most appropriate ones in each context.



The theoretical classes will be taught in Spanish. The language for the practical and laboratory classes will be specified in the course guidelines available on the website for this 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

Students are recommended to have passed the course on Fundamentals of Databases before taking this course.

COMPETENCES / LEARNING OUTCOMES

1406 - Degree in Data Science

(CB4) Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

(CE02) To methodologically know and apply the programming techniques and the algorithms necessary for the efficient processing of information and the computer resolution of problems that use large volumes of data.

(CE04) To know and use the different models of data storage and database management systems using programming languages for the definition, query and handling of data.

(CE08) Ability to understand, select and use the infrastructure and the techniques used to handle mass data, according to criteria of efficiency, scalability, security, error tolerance and adaptation to the production environment.

(CE11) Ability to design and implement data acquisition, its integration, transformation, selection, verification of its quality and veracity from different sources, taking into account its character, heterogeneity and variability.

(CG03) Capability to elaborate models, calculations, reports, to plan tasks and other works analogous to the specific field of data science.

(CG06) Ability to access and manage information in different formats for subsequent analysis in order to obtain knowledge from data.

(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.

(CT05) Ability to evaluate the advantages and disadvantages of different methodological and / or technological alternatives in different fields of application.



DESCRIPTION OF CONTENTS

1. Parallel and distributed databases

Database-system architectures. Parallel databases. Parallel query processing. Distributed databases. Distributed storage, query processing and recovery.

2. Query processing and optimization

Evaluation and measures of query cost: selection, join and other operations. Query optimization. Query evaluation in parallel and distributed databases.

3. Data warehousing and multidimensional model

Data warehousing: models and operations. Multidimensional model: OLAP models, SQL:1999.

4. NoSQL databases

Data models for new requirements: Big Data, semi-structured and unstructured data, distributed architectures. Column-oriented databases. Document-oriented databases. Graph-oriented databases.

5. Integration of data and data migration processes.

Integration of data from various sources. The ETL process: extraction, transformation and loading. Aspects to consider in data migration process.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	30,00
Laboratory	20,00
Classroom practices	10,00
Total hours	60,00

NON PRESENCIAL ACTIVITIES



Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	25,00
Preparation of lessons	40,00
Preparation for assessment activities	10,00
Resolution of case studies	0,00
Total hours	90,00

TEACHING METHODOLOGY

MD1 - Theoretical activities. Expository development of the subject in which students will be encouraged to participate in solving specific issues by completing individual evaluation questionnaires (CG03, CT02, CT05, CE04, CE08).

MD2 - Practical activities. Students will learn by solving problems, completing exercises and analyzing case studies to acquire competences in the various aspects of the subject (CB4, CE08, CE11).

MD4 – Work in the laboratory and/or computer classroom. Students will learn by carrying out activities individually or in small groups in the laboratory and/or computer room (CG06, CE02, CE04, CE08).

The University of Valencia's e-learning platform (*Aula Virtual*) will be used to communicate with the students. Students will also have access to the learning materials used in class and the problems and exercises they need to solve via this e-learning platform.

EVALUATION

SE1 - Objective test. This will consist of one or more exams comprising theoretical and practical issues and problems. The score obtained on this component will account for 50% of the final grade for the first examination sitting. Students will need to obtain a minimum score of 5 points out of 10 on this component to pass the course (CG03, CT02, CT05, CE04, CE08)

SE2 - Evaluation of practical activities based on the student's preparation of papers/reports and/or oral presentations. These practical activities will be conducted in the computer laboratory. Attendance is compulsory unless absence is properly justified. The score obtained on this component will account for 30% of the final grade (CB4, CE08, CE11).



SE3 - Continuous assessment based on the student's participation and degree of involvement in the teaching-learning process and taking into account his/her attendance at face-to-face activities, solutions to issues and problems set periodically, and presentation and exposition of assignments. The score obtained on this component will account for 20% of the final grade (CG06, CE02, CE04, CE08).

The activities on components SE2 and SE3 cannot be retaken, except for certain items from block SE2 agreed upon with the faculty.

The second examination sitting will comprise an exam that will account for 60% of the final grade. A minimum of 5 points out of 10 will be needed to pass the exam, and the grade obtained during the academic year in blocks SE2 and SE3 will represent 25% and 15%, respectively (with the possibility of retaking certain items from block SE2).

Copying or plagiarism or any other fraudulent practice in any activity that is part of the evaluation will result in the impossibility of passing the course, and the student will then be subject to the appropriate disciplinary procedures indicated in the ACTION PROTOCOL FOR FRAUDULENT PRACTICES AT THE UNIVERSITY OF VALENCIA ([ACGUV 123/2020](#)).

In all cases the evaluation system will be governed by the University of Valencia's regulations on grading and assessment for bachelor's degrees and master's degrees, which is available at:

http://www.uv.es/graus/normatives/2017_108_Reglament_avaluacio_qualificacio.pdf

REFERENCES

- Ramakrishnan, R.; Gehrke, J. Sistemas de gestión de bases de datos / Database Management Systems. McGraw-Hill
- Elmasri, R.; Navathe S. B. Fundamentos de bases de datos / Fundamentals of Database System. Pearson
- Silberschatz, A.; Korth, H. F.; Sudarshan, S. Fundamentos de bases de datos / Database System Concepts. McGraw-Hill



- Inmon, W. H.; Linstedt, Daniel. Data Architecture: A Primer for the Data Scientist: Big Data, Data Warehouse and Data Vault. Morgan Kaufmann Publishers Inc
- Adamson, C.; Kimball, R. Mastering data warehouse aggregates. Willey
- Robinson, Ian; Webber, Jim; Eifrem, Emil. Graph Databases. OReilly Media
- Strauch, Christof. NoSQL databases. Stuttgart Media University. <http://www.christof-strauch.de/nosql dbs.pdf>