

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

Code	36511
Name	Exploitation of Data Warehouses
Cycle	Grade
ECTS Credits	6.0
Academic year	2023 - 2024

Study (s)

Degree	Center	Acad. year	Period
1332 - Degree in Business Intelligence and Analytics	Faculty of Economics	3	First term

Subject-matter

Degree	Subject-matter	Character
1332 - Degree in Business Intelligence and Analytics	11 - Tecnología y Programación	Obligatory

Coordination

Name	Department
GUTIERREZ MORET, JULIAN	240 - Computer Science

SUMMARY

The subject "Exploitation of data warehouses" is a subject taught in the first semester of the third year of the Degree in Business Intelligence and Analytics. This course addresses the fundamentals of information organization in data warehouses and data integration processes in business intelligence environments.

In the course, data warehouses are presented as the best way to store data for the statistical exploitation of information and their characteristics and theoretical foundations are described, as well as the different models of representation and access to data. The fundamentals of data warehouse system architectures are introduced as an indispensable element in business intelligence environments.



In particular, the subject focuses on data warehouse modeling for the storage and integration of information from data sources in different formats.

On the relational model of the data warehouse, the students will first learn to work with the data in the data warehouse through advanced Structured Query Language (SQL) making use of operators such as ROLLUP, and GROUPING SETS for the generation of indicators.

Second, you will learn how to design and implement data warehouse databases on top of this model, using star and snowflake design models.

Finally, the course provides a first approach to applications with access to data warehouses for ETL processing.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

It is advisable to have taken the Programming and Fundamental Algorithms and Data Modelling course prior to taking this course.

OUTCOMES

1332 - Degree in Business Intelligence and Analytics

- 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.
- Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.
- Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.
- Acquire basic training that can be used to learn new methods and technologies and to adapt to new situations in academic and professional areas.
- Be able to produce models, calculations and reports, and to plan tasks in the specific field of business intelligence and analytics.



- Be able to access and manage information in different formats for subsequent analysis in order to obtain knowledge through data.
- Be able to use ICT, both in academia and in professional practice.
- Know the different types of data.
- Reorganise and restructure variables and databases.

LEARNING OUTCOMES

Know the basic theories and models of data warehouses.

Have the knowledge to define and design an information storage and exploitation system for a business environment.

Know the data integration mechanisms: Data extraction, transformation and loading processes.

Have the ability to design advanced data queries on information systems.

DESCRIPTION OF CONTENTS

1. Introduction to Data Warehouses.

Definition of Business Intelligence
Business Intelligence processes
Definition of data warehouses
Data Warehouse Features

2. Architecture, modeling and design of Data Warehouses.

Data warehouse architecture.
Multidimensional modeling for data warehouse systems.
Star modeling
Modeled in snowflake.
Design of data warehouse systems.

3. Data integration. ETL processes.

What are ETL processes?
Stages of the ETL process
Extraction processes
Transformation processes
Loading processes



ETL processing tools

4. Advanced SQL for statistical exploitation in data warehouse environments.

Structured Query Language (SQL) Statements
Advanced Structured Query Language (SQL):
ROLLUP, GROUPING SETS...

5. Data quality in data warehouse systems.

What are data quality processes?
Data quality objectives
Transformation processes and data quality
Tools

6. Using Data Warehouse for Business Intelligence.

Business Intelligence Reports
Business Intelligence Analytics
Business Intelligence Data Mining
Business Intelligence Dashboards
Tools

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	30,00	100
Development of group work	5,00	0
Development of individual work	20,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	25,00	0
TOTAL	150,00	



TEACHING METHODOLOGY

The learning process will be based on a combination of lectures, problem resolution sessions and practical activities (computer based laboratories). It will be complimented with the student personal work.

- Lectures will have a duration of 120 minutes, and different subjects will be taught, trying to promote the students participation.
- Practical activities will be based on problems resolution in the classroom. The duration of the sessions will be 120 minutes. Some of the planned activities are:
 - Problems resolution sessions
 - Seminars in regular classrooms and computer facilities
 - Debates, problems resolution and exercises previously worked by students
 - Individual tutorials
- Laboratory sessions will focus on the resolution of problems introduced in the regular lectures, with a duration of 120 minutes.
- Individual personal work for promoting the autonomous learning process, based on these aspects:
 - Preparation of lectures and reading of recommended texts
 - Problems resolution
 - Homework to be evaluated by the lecturer
 - Laboratory sessions preparation with anticipation

The virtual learning platform of the UVEG (Aula Virtual) will be used as a support to the teaching process and the student-lecturer communication. All the course material will be made available in this platform.

EVALUATION

Students will do 2 types of work:

1. Autonomous auto-learning work
2. Supervised work

1. Autonomous work for auto-learning will consist of activities done outside the regular schedule. The lecturer will guide this type of activities (readings, problems resolution, researching, etc.), but they will not be marked, although students could ask the lecturer for their revision in the individual tutorials.

2. Supervised work will consist of activities proposed by the lecturer, and they will be marked in order to evaluate the student evolution (**N_Activities**). The types of work are:

1. Individual activities



2. Group activities

3. Practical work with computers

The main characteristics of these activities are:

- They will be evaluated by the lecturer
- They will have a deadline or will be made in-person
- They are mandatory
- They are not recoverable in the second call

The student will have to pass one exam during the semester (**N_exam**). The final mark will be calculated using this formula:

Final Mark = 50% N_Exam + 50% N_Activities

It will be necessary to get, at least, 5 out of 10 at N_Exams for the formula to be applied. The minimum qualification of N_Activities will be 3,5 of 10 and for the formula to be applied and will be kept for the second call.

In any case, the evaluation of this subject will be done in compliance with the University Regulations in this regard, approved by the Governing Council on 30th May 2017 (ACGUV 108/2017)

This assessment starts from the premise that teaching at the University of Valencia is, by definition, on-campus lecture delivery method. In this sense, the student should be aware that attendance at both the theoretical and practical lectures is essential for proper monitoring of the contents of the course. The student must also consider the possibility to enroll part time (except in the case of students who register for the first time), when it is unable to attend all courses (60 credits). However, there is an exception for those students that justify it and request it. They have the possibility of being assessed without attending to all or part of the lectures. For these cases, students should proceed as follows:

- At the beginning of the course, student should inform to lecturer responsible for the course, the incidence that makes her/him unable to attend the class. This must be adequately justified in documentary form.
- The lectures in charge, in the light of this information, will decide the possibility of evaluation without full or partial assistance to the lectures.

Students who are in this situation must submit for evaluation all work required by the lecturer (not necessarily the same to those required for the course) and may also be called to defend them orally to the lecturer, and conduct a knowledge test. The weight of the final grade work will be 50% and the test the remaining 50% knowledge.



REFERENCES

Basic

- Inmon W.H.; Building the Data Warehouse, 4th Edition; Wiley; 2005.
- Jarke M., Lenzerini M., Vassiliou Y., Vassiliadis P.; Fundamentals of Data Warehouses, 2nd Edition; Springer; 2010.
- Kimball R., Ross M.; The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition; Wiley; 2013
- Kimball R., Ross M., Thornthwaite W.; Mundy J., Becker B.; The Data Warehouse Lifecycle Toolkit, 2nd Edition; Wiley; 2017.