1. OVERVIEW

Subject area	Databases
Degree	Bachelor's Degree in Data Science
School/Faculty	STEAM
Year	2
ECTS	6
Type	Compulsory
Language(s)	Spanish
Delivery Mode	On campus
Semester	First

2. INTRODUCTION

Databases is a second-year compulsory subject, worth 6 ECTS, in the Bachelor's Degree in Data Science.

This subject area aims to:

• Teach the importance in the 21st Century of the many possible uses of database management software.
• Teach how to access a database.
• Learn suitable control of SQL language.
• Design effective computer systems using databases.
• Recognise the design models and specifications of databases.
• Improve decision-making skills based on database information.

3. SKILLS AND LEARNING OUTCOMES

Basic skills (CB, by the acronym in Spanish):

• CB1: Students have shown their knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.
• CB2: Students can apply their knowledge to their work or vocation in a professional manner and possess the skills which are usually evident through the forming and defending of opinions and resolving problems within their study area

Cross-curricular skills (CT, by the acronym in Spanish):
• CT02: Independent learning: skills for choosing strategies to search, analyse, evaluate and manage information from different sources, as well as to independently learn and put into practice what has been learnt.

- CT04. Written/spoken communication: ability to communicate and gather information, ideas, opinions and viewpoints to understand and be able to act, spoken through words or gestures or written through words and/or graphic elements.
- CT05: Analysis and problem-solving: be able to critically assess information, break down complex situations, identify patterns and consider different alternatives, approaches and perspectives in order to find the best solutions and effective negotiations.

Specific skills (CE, by the acronym in Spanish):

- CE3. Knowledge of the core principles and applications of software development and databases.
- CE4. Ability to successfully apply data type models and algorithms to create solutions to problems in the data science field.
- CE5. Ability to design, implement, gather, store and exploit databases and database management systems to create solutions to problems in the data science field.

Learning outcomes (RA, by the acronym in Spanish):

- Understand the importance in the 21st Century of the many possible uses of database management software.
- Learn and know how to apply persistent storage techniques.
- Know how to apply the basic database design concepts so that it reflects a data system.
- Be able to develop and maintain basic relational databases.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CB2	Understand the importance in the 21st Century of the many possible uses of database management software.
CT05, CE3	Learn and know how to apply persistent storage techniques.
CE4, CE5	Know how to apply the basic database design concepts so that it reflects a data system.
CT02, CT04	Be able to develop and maintain basic relational databases.

4. CONTENTS

THEORY
Unit 1 Principles of databases
Unit 2 Conceptual modelling
Unit 3 Relational modelling
Unit 4 Normalisation
Unit 5 Security and integrity

SYLLABUS: LABORATORY WORK
Topic 1: SQL working environment
Topic 2: Database queries (I)
Topic 3: Database queries (II)
Topic 4: Linking tables
Topic 5: Data definition and processing
Topic 6: Calculations and aggregation of columns (I)
Topic 7: Calculations and aggregation of columns (II)
Topic 8: Filter and aggregation
Topic 9: Set operations
Topic 10: Temporary tables
Topic 11: Views

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

• Aims and interests survey.

• Master lecture and seminars.

• Laboratory work.

• Case study analysis.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
Master classes	40
Problem solving and case studies	10
Laboratory work (exercises led by the teacher)	15
Knowledge tests	8

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Independent working	50
Tutorials	7
Practical work at home	20
TOTAL	**150**

Online:

Learning activity	Number of hours
Online classes with presentations	40
Online classes with problem-solving and case studies	10
Computer practice at home (exercises led by the teacher)	15
Knowledge tests	8
Independent working	50
Tutorials	7
Practical work at home	20
TOTAL	

7. ASSESSMENT

The assessment methods, plus their weighting in the final grade for the subject area, are as follows:

On campus:

Assessment system	Weighting
Exams and practical SQL exercises	45
Theory exam. Core knowledge and entity relationship design	45
Submission of exercises	10

Online:

Assessment system	Weighting
Exams and practical SQL exercises	45
Theory exam. Core knowledge and entity relationship design	45
Submission of exercises	10

On the Virtual Campus, when you open the subject area, you can see all the details of your assessment activities and the deadlines and assessment procedures for each activity.

8. BIBLIOGRAPHY

The reference publication to accompany this subject area is:

- Fundamentos de Bases de Datos Silberschatz, Abraham ; Korth, Henry F. Edición: MC Graw Hill, 014 ISBN:978-84-481-9033-0

The recommended bibliography is indicated below:
 • Sistemas de bases de datos : un enfoque práctico para diseño, implementación y gestión
Connolly, Thomas M.; Begg, Carolyn E. Edición:Madrid : Addison Wesley, 2005 ISBN:84-7829-075-3

•Fundamentos de sistemas de bases de datos Elmasri, Ramez ; Navathe, Shamkant B.
Edición: Madrid : Pearson Addison-Wesley, 2007 ISBN: 978-84-7829-085-7

•Introducción a los sistemas de bases de datos
Date, C. J Edición: México : Pearson Educación, 2001 ISBN: 968-444-419-2