1. OVERVIEW

Subject Area	Data Engineering II
Degree	Bachelor's Degree in Business Analytics
School/Faculty	Social and Communication Sciences
Ac. Year	Third
ECTS	6
Type	Compulsory
Language(s)	Spanish/English
Delivery Mode	On campus
Term	2º
Academic Year	2024-25
Coordinating professor	HUGO VISIER

2. INTRODUCTION

The subject of Data Engineering relates to the processing of large volumes of information. As such, students will explore the methods used to aggregate information such as distributed databases, data warehouses or cloud databases. The subject will also focus on Big Data, i.e., data sets that are designed to manage enormous volumes of information and require unstructured architecture which promotes efficiency of access.

3. SKILLS AND LEARNING OUTCOMES

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

- CB4: Students can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Cross-curricular skills (CT, by the acronym in Spanish):

- CT2 - 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.

- CT4 - Written/spoken communication: Ability to present and gather information, ideas, opinions and viewpoints to understand and take appropriate action, either in spoken form through words or gestures, or in written form through words and/or graphical elements.

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

- CE20 - Ability to develop a strategy for the purpose of studying business variables and indicators.
- CE21 - Ability to segment and select the appropriate target audience in view of the interests of individual business initiatives.
- CE22 - Ability to select and apply the most suitable analytical tools in view of the specific situation facing a business
- CE23 - Ability to select, configure and analyse metrics related to sources of information according to the field in question (marketing, finance, etc.)
- CE24 - Ability to identify information needs, depending on the stated objectives of the task in question
- CE26 - Critical spirit and objectivity to challenge data or assumptions based on previous data
- CE28 - Ability to recognise and understand the "data cycle": data acquisition and creation, information construction, analysis and visualisation.
- CE29 - Ability to ask the right questions in relation to the anticipated objective of knowledge, with a view to formulating and adding suitable "queries" to the data storage system.
- CE31 - Ability to manage uncertainty caused by constant changes to information sources
- CE33 - Ability to draw on the necessary technical expertise to effectively operate statistical computer and other simulation tools.

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

- RA1. Recognise some of the main databases and technologies used in data storage
- RA2. Understand the importance of data science
- RA3. Describe automated learning techniques, choosing the most suitable and using them to come up with a solution to any given problem.
- RA4. Learn how to address the problem of high dimensionality in the field of Big Data by connecting them with real-life cases, set out how they have evolved and identify future applications.
- RA5. Realise when supervised and non-supervised learning techniques are used.
- RA6. Use data visualisation to improve interpretability of analysis, based on specific languages and environments.
- RA7. Examine different case studies relating to automatic learning techniques in the field of business.
- RA8. Understand and address the main problems that a data analyst may face.

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

Skills	Learning outcomes
CB4, CT2, CT4, CE31	RA1, RA2
CE24, CE29, CE31	RA3
CE22, CE25	RA4, RA5
CE20, CE21, CE23, CE28, CE26, CE29, CE33, CE31	RA6, RA7, RA8

4. CONTENTS

Introduction to Probabilistic Learning
Bayes Classifier
Bayesian Networks: Case study on Probabilistic Techniques
Set-based Learning
Non-Linear Learning Systems
Advanced Sampling, Selection and Feature Extraction Techniques
Predictive Analytics: Case Study on Predictive Techniques
Advanced Visualisation and Interpretation Techniques
Case Studies: Automatic Learning Applications in Business

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

- Lecture/online conference
- Case study method
- Problem-based learning (ABP, as per the Spanish acronym)
- Learning based on workshop teaching

6. LEARNING ACTIVITIES

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

Learning activity	Number of hours
Tutorials	10
Lectures	20
Asynchronous lectures	10
Case study analysis	15
Problem-solving	20
Written reports and essays	15
Independent assignment	30
Workshop and/or laboratory assignments	30
TOTAL	**150**

7. ASSESSMENT

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

Assessment system	Weighting
On-campus knowledge tests	40%
Practical exercises. Case study/problem scenario	40%
Oral presentations	20%

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

7.1. Ordinary exam period

To pass the course in the ordinary examination period you must obtain a grade of 5.0 or more out of 10.0 in the final grade (weighted average) for the subject area.

In any case, you must achieve a grade greater than or equal to 4.0 in the final assessment so this can be used for the average with the other activities.

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7.2. Extraordinary exam period (resits)

To pass the course in the ordinary examination period you must obtain a grade of 5.0 or more out of 10.0 in the final grade (weighted average) for the subject area.

In any case, you must achieve a grade greater than or equal to 4.0 in the final assessment so this can be used for the average with the other activities.

Activities not passed in the ordinary exam period, or those not delivered, must now be delivered after having received the relevant corrections to them by the lecturer.

8. TIMELINE

The timeline with delivery dates of assessable activities in the subject area is indicated in this section:

Assessable activities	Date
Activity 1.	Week 2-3
Activity 2.	Week 5-6

Activity 3.	Week 8-9
Activity 4.	Week 11-12
Activity 5.	Week 14-15
Activity 6.	Week 16-17
Final test	Week 17-18

The timeline may be subject to modifications for logistical reasons of the activities. Students will be informed of any changes in due time and course.

9. BIBLIOGRAPHY

The work of reference for follow-up of the course is:

- Lantz, B. (2019). Machine learning with R: expert techniques for predictive modeling. Packt publishing ltd

- Robles et al., (2020) Big data para Científicos Sociales. Una introducción. CIS: centro de investigaciones sociológicas.

10. DIVERSITY AWARENESS UNIT

The Educational Guidance and Diversity Unit (ODI in Spanish) offers support throughout your time at university to help you with your academic achievement. Other cornerstones of our educational policy are the inclusion of students with special educational needs, universal access in all our university campuses and equal opportunities.
This ODI unit offers students:

1. Support and monitoring through counselling and personalised student plans for those who need to improve their academic performance.
2. Curricular adaptations to uphold diversity, with assistance for those students who require specific educational support, leading to equal opportunities without significant changes to methodology or evaluation.
3. We offer students a range of extracurricular educational resources to reinforce skills which will enhance their personal and professional development.
4. Career guidance by giving tools and advice to any students who have doubts about their career or think that they have chosen the wrong degree.

Students who need educational support can contact us at:
orientacioneducativa@universidadeuropea.es

11. SATISFACTION SURVEYS

Your opinion matters!

Universidad Europea encourages you to complete our satisfaction surveys to identify strengths and areas for improvement for staff, degree courses and the learning process.

These surveys will be available in the surveys area of your virtual campus or by email.

Your opinion is essential to improve the quality of the degree.

Many thanks for taking part.

COURSE WORK PLAN

HOW TO CONTACT YOUR TEACHER

If you have any questions about course content or activities, remember to post them in your course forums so that all your classmates can read them.

Someone else might have the same question as you!

If you have any questions exclusively for your teacher, you can send them a private message via the Virtual Campus. Should you need further assistance on a particular issue, you can arrange a tutorial.

Frequently reading the messages sent by students and teaching staff is recommended as they constitute another learning channel.

TIMELINE

The course schedule and deadlines for assignments assessed as part of the course are outlined below:

Week	Contents	Learning/Assessed Activities	Weighting in the final assessment

Students will be reliably and promptly informed of any changes to this schedule.

DESCRIPTION OF ASSESSMENT ACTIVITIES

Activity 1.

Activity 2.

Activity 3.

Activity 4.

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RUBRIC OF ASSESSMENT ACTIVITIES

PLAGIARISM RULES

In line with the disciplinary rules for students of Universidad Europea:

- Plagiarism of all or part of any kind of intellectual work is considered a serious offence.
- If students commit the very serious offence of plagiarism and cheating to pass an assessment test, they will be disqualified from the corresponding exam, and their absence and the reason for this absence will be filed in their academic record.