Course guide
295911 - EDAN - Data Engineering and Business Analytics

Last modified: 29/06/2026

Unit in charge: Barcelona East School of Engineering
Teaching unit: 732 - OE - Department of Management.

Degree: BACHELOR'S DEGREE IN BIOMEDICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN ENERGY ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: JUAN MARTINEZ SANCHEZ

Others: Primer quadrimestre:
JUAN MARTINEZ SANCHEZ - Grup: T11

PRIOR SKILLS

Interest in business management and strategy, big data and data analysis.
Have passed the statistics course. Students must be able to read the bibliography in English, although some parts of the material will be given exclusively in Catalan.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEB-03. Understand the basics behind the use and programming of PCs, operating systems, databases and software with applications in engineering.
CEI-17. Understand the applications of business organisation.

Transversal:
01 EIN N1. ENTREPRENEURSHIP AND INNOVATION - Level 1. Showing enterprise, acquiring basic knowledge about organizations and becoming familiar with the tools and techniques for generating ideas and managing organizations that make it possible to solve known problems and create opportunities.
06 URI N1. EFFECTIVE USE OF INFORMATI0N RESOURCES - Level 1. Identifying information needs. Using collections, premises and services that are available for designing and executing simple searches that are suited to the topic.

TEACHING METHODOLOGY

This course combines lectures with individual exercises and a team project. Students are required to have a reasonably up-to-date computer capable of running Python and executing machine learning scripts.

LEARNING OBJECTIVES OF THE SUBJECT

The objectives of this course are to introduce the main concepts of Data Science and their application to business management, marketing, innovation, and decision-making, with the aim of achieving a competitive advantage.

The course also aims to enable students to apply basic Machine Learning and Agentic AI techniques for information processing, decision support, and business management.

A basic knowledge of Python is recommended.

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	30.00
Self study	90,0	60.00
Hours small group	15,0	10.00

Total learning time: 150 h

CONTENTS

title english

Description:
1 - Introduction to Business Analytics and Data Science for business decision-making.
2 - Fundamentals of Machine Learning and its main business applications.
3 - Evaluation and selection of Machine Learning models based on performance metrics and business objectives.
4 - Large Language Models (LLMs), Retrieval-Augmented Generation (RAG) systems, and AI agents for process automation, information analysis, and decision support.
5 – Management of data analysis projects in the company and preparation of reports.
6 - AutoML with Pycaret

Specific objectives:
The course aims to equip students with the knowledge and skills to develop Business Analytics projects and apply Machine Learning and Artificial Intelligence tools to analyze data, automate processes, and support business decision-making.

Full-or-part-time: 150h
Theory classes: 45h
Practical classes: 15h
Self study : 90h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the **Action Framework for Academic Integrity in Assessment at the UPC**.

The final course grade is calculated as the arithmetic mean of the following assessment components, all of which carry equal weight:

Midterm Exam 1 (25%)
Midterm Exam 2 (25%)
Midterm Exam 3 (25%)
Project (25%)

There is no resit examination for this course.

BIBLIOGRAPHY

Basic:
- Vijay Kotu, Bala Deshpande. Data science : concepts and practice. Second edition. Amsterdam: Morgan Kaufmann, 2018. ISBN 9780128147610.
- Marr, Bernard. Big data en la práctica : cómo 45 empresas exitosas han utilizado análisis de big data para ofrecer resultados extraordinarios. Zaragoza: TEELL, 2017. ISBN 9788416511167.

RESOURCES

Other resources:
Notes distributed at ATENEA in CATALAN.