



Universidad
de Navarra

Machine learning
Guía docente 2025-26

PRESENTACIÓN

Breve descripción:

- **Degree:** ECOB, ADEb
- **Módulo/Materia:** Módulo 7. Materias Optativas. Materia 7.2; optativas específicas
- **ECTS:** 6
- **Course, semester:** 3º(ECO+DATA), 4º (ECO+IEF), first semester
- **Carachter:** for profiles ECO+Data, ECO+IEF
- **Professor:** Ignacio Rodríguez Carreño, irodriguez@unav.es
- **Language:** English
- **Classroom, schedule:** Computers Lab in the ground floor (Amigos Building). Tuesdays from 12:00 to 14:00 h. and Wednesdays from 10:00 to 12:00 h.
<https://mese.webuntis.com/WebUntis/index.do?school=universidad%20de%20navarra#/basic/timetable?selectedTab=3>

RESULTADOS DE APRENDIZAJE (Competencias)

Competencias optativas de perfil:

SSOP1. Accessing and managing massive data.

SSOP2. Understanding programming languages potentially used to solve economic and/or business problems.

SSOP4. Identify patterns and trends and gather useful information from massive data in economics and/or business.

SSOP5. Effective communication of results to a professional audience in economics and/or business.

PROGRAMA

1. Introduction to Machine Learning..
2. Basics of R and Python
3. Dimmensionality Reduction: pca, t-sne
4. Unsupervised Learning: clustering, Kmeans and other algorithms
5. Supervised Learning: knn, Naive Bayes, decision trees, SVM, neural networks, bagging bagging (randomforest) and boosting
6. Association Rules
7. Algorithms for Text analysis.

ACTIVIDADES FORMATIVAS

Classes. There will be theoretical classes showing the concepts and computer practices with the programming language and tools chosen.



Universidad
de Navarra

Attendance. Attendance is compulsory and will have to attend the 80% of the clases to get the **10%** of the final grade.

Final project. The students will have to do a final project by pairs that will be **20%** of the subject. Students will write their own machine learning code. Students will record a short video presentation (5 minutes) about their project.

Midterm exam. The students will have to do a midterm exam in computers lab that will be the **20%** of the subject.

Final exam. The students will have to do a final exam in computers lab that will be the **50%** of the subject. The students will have to get a 5/10 in order to average with the rest of the assesments

EVALUACIÓN

Ordinary evaluation:

SE1. Attendance. It will have a value of **10%** of the final grade of the ordinary evaluation.

SE2. Project. It will consist of carrying out a project of the subject that includes group work that will include a video with a presentation on it (**30%**)

SE3. Exams. There will be a midterm and a final exam that will worth **20 and 50%** of the final grade, respectively.

Extraordinary evaluation:

For the extraordinary evaluation, the Project will account for the **30%** and the final exam will account for the **70%** of the grade.

HORARIOS DE ATENCIÓN

Dr. Ignacio Rodríguez Carreño. (irodriguez@unav.es)

- Office 2080 Amigos building. 2nd floor-corridor
- Office Hours: Wednesdays from 15:00 to 18:00 h.

BIBLIOGRAFÍA

- Lantz, Brett: *Machine Learning with R*. [Find it in the library](#).
- [An Introduction to Statistical Learning with Applications in R](#), G. James, D. Witten, T. Hastie and R. Tibshirani
- [A Course in Machine Learning](#), H. Daumé III
- [Bayesian Reasoning and Machine Learning](#), David Barber
- [The Elements of Statistical Learning: Data Mining, Inference, and Prediction](#), T. Hastie, R. Tibshirani, J. Friedman
- [R for Data Science](#)
- [Text mining with R](#). Os puede interesar si queréis hacer text mining.



Universidad
de Navarra

- [Un tutorial breve de R](#)

A [link](#) to find R packages related to Machine Learning. For databases:

- [UCI Machine Learning Repository](#)
- [Kaggle](#). You have to register to download databases for free.
- [Bases de datos de paquetes de R](#). There is a description and the database.

Some *cheatsheets* for R:

- [R Base](#)
- [Import data](#)
- [Data transformation](#)
- [Gráficos con ggplot](#)

Some cheatsheets for Python:

- [Python for begginers](#)
- [Pandas- Python](#)