Universidad de Navarra

Data analysis (F. Ciencias)

Teaching guide 2025-26

INTRODUCTION

Course description: This course will offer operative knowledge aimed to extract information from data. It will be a very practical course, focused on well-proven procedures that will introduce the workflow of several types of data analysis. Dealing with data often involves retrieving, inspecting and analizing, modelling, fitting, and gaining new knowledge. All along the course, R and Rstudio will be intensively used for these tasks.

- **Degrees**: Environmental Sciences, Chemistry, Biochemistry.
- **Module in the degree program**:
- **ECTS**: 3
- **Course and Semester**: 3rd and 4th. First semester.
- **Type of Course**: Optative
- **Instructors**: Sergio Ardanza-Trevijano
- **Language**: English
- **Lecture Schedule**: Thursday, 12-14.

LEARNING OUTCOMES (Competencies)

These statements are excerpts from an official document for which no approved translation is available yet

1. GRADO DE CIENCIAS AMBIENTALES

Competencias específicas:

CE1 Conocer las bases científicas necesarias para afrontar la formación específica ambiental.

CE4 Utilizar en el laboratorio las técnicas e instrumentos propios de la experimentación científica.

Competencias generales y básicas:

CG2 Pensar de forma integrada y abordar los problemas desde diferentes perspectivas.

- CG3 Tener razonamiento crítico.

PROGRAM

1. Data Wrangling. Read, write, split, filter, combine and make datasets tidy.
2. Exploratory Data analysis. Exploratory graphs and Statistics. Differences between exploratory and expository graphs.
3. Linear Models.
4. Case Analysis.

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ACTIVITIES

Lectures.- The main theoretical concepts, procedures, and algorithms will be explained in about 20 hours.

Seminars.- Problem solving and skill development: 4 hours. More time can be devoted to seminars if the need is felt by the professor; in that case, the hours will be subtracted from lectures.

Hands-on data analysis.- Practical computer labs. 6 hours. It can be extended if needed, taking time from lectures or seminars.

Exams.- 2 hours.

Personal study, problem solving and computer programming.- About 30 hours is advisable to the average student.

EVALUATION

Practical/Theoretical quizzes: 40%

Final project: 50% (to be handed the date assigned for the final exam or earlier)

Participation in class and in DataCamp assignments: 10%

Plagiarism or cheating will result in a failure. The legal text (in Spanish) concerning this issue is inserted here:

La falta de originalidad o plagio en los trabajos conllevará el suspenso de la asignatura, de acuerdo con la normativa de la Universidad

http://www.unav.edu/documents/11306/6613867/Normativa+Disciplina+Academica.pdf

- NOTA: Ante la evidencia de un alumno que copia en un examen o comete cualquier tipo de plagio en los trabajos, se le suspenderá la asignatura hasta la siguiente convocatoria

Evaluation of the extraordinary call

Project: 50% of grade (50% will be kept from quizzes and DataCamp assignments from the regular year).

OFFICE HOURS

Sergio Ardanza-Trevijano. (sardanza@unav.es)

- Castaños building, department of Physics and Applied mathematics.
- Schedule: appointment by email.

BIBLIOGRAPHY

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- GARRET GROLEMUND and HADLEY WICKAM **"R for data Science"** (O'Reilly) Read it online
- KIERAN HEALY **"Data Visualization. A practical Introduction"** (Princeton University Press) Read it online
- PAUL TEETOR, **"The R Cookbook"** (O'Reilly) Find it in the Library ; Read it on line
- PETER DALGAARD, **"Introductory Statistics with R"** (Springer) Find it in the Library; Find it in the Library [electronic resource]
- Many online resources can be helpful to learn R. Some of them will be presented in the lectures.