UAB
Universitat Autònoma de Barcelona

Introduction to Data Analysis

Code: 106737
ECTS Credits: 6

2025/2026

Degree	Type	Year
Political Science and Public Management	FB	1

Contact

Name: Guillermo Rico Camps

Email: guillem.rico@uab.cat

Teachers

Rubén Garcia Del Horno

Teaching groups languages

You can view this information at the of this document.

Prerequisites

None.

Objectives and Contextualisation

The aim of this course is to familiarize students with the practice of data analysis. Students will learn to import, transform, and explore data to formulate and answer questions. We will prioritize practical training and the interpretation and presentation of results over mathematical issues. The course revisits the use of spreadsheets and introduces students to the R language of statistical computing through RStudio, to provide the essential tools for data management, description, and visualization, reproducibility, and effective communication of results. Throughout the course we will work with real-world, socially relevant data, while also encouraging a critical and responsible usage of open data.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Applying the different behaviour analysis techniques and political actors to real cases from the internal and international political arena.
- Applying the discipline's main theories and different fields to real practical and professional problems.
- Arguing from different theoretical perspectives.
- Assess the social, economic and environmental impact when acting in this field of knowledge.

- Demonstrating good writing skills in different contexts.
- Demonstrating the comprehension of the logic behind the scientific analysis of political sciences.
- Designing data collection techniques, coordinating the information processing and meticulously applying hypothesis verification methods.
- Develop critical thought and reasoning and be able to communicate them effectively, both in your own language and second or third languages.
- Develop strategies for autonomous learning.
- Interpreting and applying English texts in an academic way.
- Make changes to the methods and processes of the area of knowledge to provide innovative responses to the needs and wishes of society.
- Managing the available time in order to accomplish the established objectives and fulfil the intended task.
- Managing the methodological foundations of politic sciences.
- Realising effective oral presentations that are suited to the audience.
- Showing a good capacity for transmitting information, distinguishing key messages for their different recipients.
- Synthesizing and critically analysing information.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Using the main information and documentation techniques (ICT) as an essential tool for the analysis.
- Working autonomously.
- Working by using quantitative and qualitative analysis techniques in order to apply them to research processes.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Analyse political databases in each case using the appropriate basic techniques of descriptive statistics and inferential statistics.
3. Apply the corresponding statistical techniques to distinct case studies and interpret the results obtained.
4. Arguing from different theoretical perspectives.
5. Assess the social, economic and environmental impact when acting in this field of knowledge.
6. Critically assessing the usage of inductive, deductive and comparative methods.
7. Critically assessing the use of analytical instruments to validate the hypothesis raised.
8. Demonstrating good writing skills in different contexts.
9. Demonstrating the comprehension of the logic behind the scientific analysis of political sciences.
10. Designing and planning an investigation in the field of political sciences.
11. Designing data collection techniques, coordinating the information processing and meticulously applying hypothesis verification methods.
12. Develop critical thought and reasoning and be able to communicate them effectively, both in your own language and second or third languages.
13. Develop strategies for autonomous learning.
14. Interpreting and applying English texts in an academic way.
15. Make changes to the methods and processes of the area of knowledge to provide innovative responses to the needs and wishes of society.
16. Managing the available time in order to accomplish the established objectives and fulfil the intended task.
17. Managing the methodological foundations of politic sciences.
18. Realising effective oral presentations that are suited to the audience.
19. Showing a good capacity for transmitting information, distinguishing key messages for their different recipients.
20. Synthesizing and critically analysing information.
21. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
22. Use computer tools to collect, import, manipulate, visualise, describe, and model data of all kinds, and present the results.
23. Using the main information and documentation techniques (ICT) as an essential tool for the analysis.

24. Working autonomously.
25. Working by using quantitative and qualitative analysis techniques in order to apply them to research processes.

Content

1. Fundamentals of computing

2. Basic mathematical skills

3. Data: observations, variables, data frames

4. Explore and describe variables: visualization and numerical summaries

5. Explore and describe relationships between variables

6. Obtaining data

7. Data wrangling and management

8. Communication and reproducibility

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
In-class sessions: lecture and lab activities	49.5	1.98	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 18, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6
Type: Supervised			
Tutorials	15	0.6	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 18, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6
Type: Autonomous			
Study, readings, assignments	83.5	3.34	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 18, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6

Most of the sessions consist of a mix of lecture and lab activities. Students are expected to bring their laptops to class.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exams	50%	2	0.08	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6
In-class exercises	10%	0	0	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 18, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6
Take-home assignments	40%	0	0	1, 21, 5, 2, 3, 4, 9, 8, 13, 12, 10, 11, 22, 16, 14, 15, 19, 20, 25, 24, 17, 23, 7, 6

The evaluation will be based on the following activities:

- In-class exercises (10%). Attendance to the corresponding class is mandatory to pass an exercise. No late submissions will be accepted. Those who pass at least 70% of the exercises will obtain a score of 10 in this part of the evaluation. This part of the evaluation is not recoverable.
- Take-home assignments (40%). No late submissions will be accepted. This part of the evaluation is not recoverable.
- Exams (25% + 25%). Two closed-book, multiple-choice midterm exams covering the course content. The exam dates will be announced at the beginning of the semester.

To pass the course, it is required that all the following conditions are met:

1. Having previously been evaluated for at least two thirds of the total evaluation activities of the subject.
2. Achieving a final grade greater than or equal to 5.
3. Achieving an average grade on the midterm exams (or on the retake exam) greater than or equal to 4.

Students who do not meet any of these three requirements may not obtain an overall grade higher than 4.5, regardless of the score resulting from the weighted sum of all activities.

Retake process

Only the portion of the grade corresponding to the exams is recoverable; in-class exercises and home assignments are excluded from the retake process.

To be eligible to participate in the retake process, it is required that the student has been previously evaluated for at least two thirds of the total evaluation activities of the subject. Students with an average grade on the exams below 4 or an overall course grade below 5 may take the retake exam. There will be a single retake exam covering the entire course content, regardless of the specific grades obtained on the midterm exams.

Important considerations

This course does not allow for unique assessment.

The fact of taking any of the exams or submitting any of the assignments exempts the student from the "Not assessable" grade.

In accordance with article 117.2 of the UAB Academic Regulation, the evaluation of those students who have been enrolled before may consist of a single synthesis examination. The students who wish to be evaluated this way should contact the professor at the beginning of the semester (first week of October at the latest).

In this course, the use of Artificial Intelligence (AI) technologies is permitted for the completion of assignments and exercises exclusively in support tasks, such as information searching or text and code correction. Students must clearly identify the tasks in which they have used this technology and specify the tools employed. However, these tools must not replace independent study or genuine understanding of the code by the student. Failure to disclose the use of AI in this graded activity will be considered a breach of academic

integrity and may result in partial or full penalties on the activity grade, or more serious sanctions in severe cases. When the code submitted in a practical assignment or home exercise is significantly different from what has been covered in class, or includes functions, structures, or libraries not explained during the course, this will be treated as a likely indicator of inappropriate use of AI and will be graded with a zero (0), regardless of its technical correctness.

Evidence of plagiarism or any other irregularity that could lead to a significant variation in the grade of an activity involves failing the corresponding evaluation with a grade of 0. In case of multiple irregularities in the evaluation of the same subject, the final grade of this subject will be 0.

Bibliography

Basic

Çetinkaya-Rundel, M., & Hardin, J. (2024). *Introduction to Modern Statistics* (2nd ed.). OpenIntro. Accessible at: openintro-ims.netlify.app.

Ismay, C., & Kim , A. Y. (2025). *Statistical Inference via Data Science: A ModernDive into R and the Tidyverse* (2nd ed.). CRC Press / Taylor & Francis Group. Accessible at: moderndive.com/v2.

Wickham, H., & Grolemund, G. (2023). *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data* (2nd ed.). O'Reilly Media. Accessible at: r4ds.hadley.nz. Spanish version: es.r4ds.hadley.nz.

Complementary

Baumer, B., Kaplan, D., & Horton, N. J. (2021). *Modern data science with R* (2nd ed). CRC Press. Freely available at mdsr-book.github.io/mdsr2e.

Bolker, E. D., & Mast, M. B. (2020). *Common Sense Mathematics* (2nd ed). American Mathematical Society.

Broman, K. W., & Woo, K. H. (2018). Data Organization in Spreadsheets. *The American Statistician*, 72(1), 2-10. doi.org/10.1080/00031305.2017.1375989.

Chang, W. (2018).. *R Graphics Cookbook: Practical Recipes for Visualizing Data* (2nd ed). O'Reilly Media. Freely available at r-graphics.org.

De Veaux, R. D., Velleman, P. F., & Bock, D. E. (2021). *Stats: Data and Models*. Pearson.

Dougherty, J., & Ilyankou, I. (2021). *Hands-On Data Visualization*. O'Reilly Media. Freely available at handsondataviz.org.

Healy, K. (2018). *Data visualization: A practical introduction*. Princeton University Press. Freely available at socviz.co.

Klass, G. M. (2012). *Just Plain Data Analysis: Finding,Presenting, and Interpreting Social Science Data* (2nd ed). Rowman & Littlefield.

Llaudet, E., & Imai, K. (2023). *Data analysis for social science: A friendly and practical introduction*. Princeton University Press.

Mas Elias, Jordi. (2020). *Análisis de Datos con R en Estudios Internacionales*. Editorial UOC. This book can be accessed via the ARE service: https://login.are.uab.cat/login?url=https://login.are.uab.cat/login?url=https://elibro.net/es/ereader/uab/167261.

Miller, J. E. (2022). *Making Sense of Numbers: Quantitative Reasoning for Social Research*. Sage.

Sevilla, A. N., & Somers, K. (2013). *Quantitative Reasoning: Tools for Today's Informed Citizen* (2nd ed). Wiley.

Wilke, C. (2019). *Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures*. O'Reilly Media. Freely available at clauswilke.com/dataviz.

Software

Microsoft Excel

R r-project.org

RStudio rstudio.com

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	51	Catalan	first semester	afternoon
(TE) Theory	1	Catalan	first semester	morning-mixed
(TE) Theory	51	Catalan	first semester	afternoon