

**Multivariable Data Analysis**

Code: 101148  
ECTS Credits: 6

Degree	Type	Year	Semester
2500262 Sociology	OB	3	1

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Prerequisites**

In order to be able to take this course, it is advisable to have successfully followed up the Quantitative Methods of Social Research and Analysis Methods.

**Objectives and Contextualisation**

This is an introductory course to the techniques of multivariate statistical data analysis that is proposed as a continuation of the quantitative perspective of social research initiated in the degree. The procedures, methods and techniques already discussed so far will be expanded to consider what we can generally call the transition from bivariate analysis procedures to multivariate analysis procedures.

In the context of the itinerary of technical and methodological subjects, which seek to offer a complete overview of the different procedures of the sociological scientific activity, and given the extension and variety of the analysis procedures in the field of social sciences, it entails directing the teaching towards the selection of a few topics or instruments considered as some of the most fundamental and of greatest interest in the practice of sociological research.

Specifically, the subject aims to:

1) From the point of view of the students, the construction of their learning will be carried out from:

- Knowledge and understanding of the main concepts associated with the multivariate analysis of statistical data, exemplified by sociological concepts.
- The ability to apply technical instruments for the advanced analysis of statistical data considered in the course.
- Know how to use statistical software for statistical analysis bivariate and multivariable.
- Know how to interpret the statistical results of a data analysis from the technical and substantive point of view according to some knowledge and study objectives of the social reality.

2) From the general conditions of a subject of this type in relation to the use of students it is about:

- Facilitate the understanding, management and interpretation of a basic algebraic and statistical conceptual system to assimilate the use of techniques that involve the quantification and formalization of social phenomena.

- Framing in a balanced, comprehensive and integrating way the contents of this subject within the set of the usual methods in sociology.

## Competences

- Applying the main quantitative and qualitative methods and techniques of social research to a specific topic.
- Describing social phenomena in a theoretically relevant way, bearing in mind the complexity of the involved factors, its causes and its effects.
- Designing a social research project by defining a comprehensive theoretical framework with clearly defined concepts, formulating consistent and significant hypothesis, choosing suitable investigation techniques for the adopted concepts, and analysing the empirical results obtained with those techniques.
- Developing critical thinking and reasoning and communicating them effectively both in your own and other languages.
- Developing self-learning strategies.
- Enumerating the methodology and investigation techniques that support the main hypothesis about social relationships, the positions and practices of individuals in a social structure and the social changes.
- Searching for documentary sources starting from concepts.
- Students must be capable of assessing the quality of their own work.
- Students must be capable of managing their own time, planning their own study, managing the relationship with their tutor or adviser, as well as setting and meeting deadlines for a work project.
- Working in teams and networking in different situations.

## Learning Outcomes

1. Defining concepts of analysis.
2. Developing critical thinking and reasoning and communicating them effectively both in your own and other languages.
3. Developing self-learning strategies.
4. Explaining the methodological basis of these quantitative and qualitative methods and techniques.
5. Formulating a hypothesis with these concepts.
6. Identifying the main quantitative and qualitative methods and techniques.
7. Indicating their dimensions, their possible quantitative indicators and the significant qualitative evidence in order to empirically observe them.
8. Measuring a social phenomenon with these instruments on the basis of a theoretical framework of analysis.
9. Mentioning the main concepts of sociology.
10. Obtaining conclusions from the information obtained with this tool.
11. Preparing an analytical tool that is significant to this hypothesis.
12. Relating them with the different approaches of sociology.
13. Searching for documentary sources starting from concepts.
14. Students must be capable of assessing the quality of their own work.
15. Students must be capable of managing their own time, planning their own study, managing the relationship with their tutor or adviser, as well as setting and meeting deadlines for a work project.
16. Using the advanced multivariate statistical tools.
17. Using the appropriate software to the advanced multivariate statistical tools.
18. Using the appropriate software to the basic multivariate statistical tools.
19. Using the appropriate software to the univariate statistical tools.
20. Using the basic multivariate statistical tools.
21. Using the univariate statistical tools.
22. Working in teams and networking in different situations.

## Content

## General introduction

- Objectives of the subject, contents, course dynamics and evaluation
- Multivariate analysis: characteristics and classification of techniques
- Software for the analysis of statistical data

## PART I. Analysis of interdependence with qualitative variables

### Unit 1. Analysis of contingency tables

- Classic analysis of multidimensional contingency tables

### Unit 2. Log-linear analysis

- General linear logarithmic analysis

## PART II. The dependence analysis

### Unit 3. Analysis of variance

- One-way analysis of variance
- Analysis of multivariate variance

### Unit 4. Regression analysis

- Simple regression analysis
- Multiple regression analysis

## PART III. The analysis of interdependence for the construction of typologies

### Unit 5. Factor analysis

- Mathematical foundations of multivariate data analysis
- Factor analysis of principal components
- Factor analysis of correspondences

### Unit 6. Cluster analysis

- Cluster analysis and the construction of typologies
- Automatic cluster analysis

## Methodology

The course is presented with a continuous dynamic of teaching and learning, which implies tracking the rhythms of the course and the various contents that have been designed in accordance with the different scheduled activities. The contents of each unit have a thread linked to the research process and the continuity of the learning of concepts and instruments that are incorporated progressively, as well as the resolution of problems and questions, which are based in the assimilation and practice of each previous topic of each unit.

Since the objective of the training is that students learn to research sociology using advanced statistical techniques, the teaching methodology and the training activities of the subject result from the combination of expositive sessions with problem solving exercises and practices in the classroom that allow to apply the acquired concepts and explained techniques, as well as tutorials of follow-up and autonomous work.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Classroom practices	14	0.56	1, 11, 5, 8, 10, 18, 20, 16
Individual preparation of practical exercises	30	1.2	3, 4, 8, 10, 18, 20, 16

Master classes	30	1.2	1, 11, 9, 4, 5, 6, 7, 8, 18, 20, 16
Programmed group tutorials	4	0.16	14, 1, 11, 5, 8, 22, 18, 20
Type: Supervised			
Programmed group tutorials	2	0.08	14, 13, 1, 11, 5, 15, 8, 10, 22, 18, 20, 16
Type: Autonomous			
Readings	30	1.2	4, 6, 8, 18, 20, 16
Work in group	30	1.2	13, 1, 11, 5, 15, 8, 10, 22, 18, 20, 16

## Assessment

The course is evaluated continuously. The subject will be passed if the final weighted average score of the assessment activities is equal to or greater than 5 out of 10.

In the evaluation, three aspects are combined:

1) The analysis works: will consist in the realization in groups of 3 people of 2 works of sociological analysis of quantitative data. The specific characteristics of the work are detailed in a specific section of the program. A minimum score of 4 out of 10 is required for each job. The works must be presented previously in a seminar. The contents are the following : 66%

1. Analysis of multidimensional and log-linear contingency tables:
  - Evaluation of the previous presentation of the work in the seminar (4%).
  - Job evaluation (29%).
2. Typological analysis combining factor analysis and classification:
  - Evaluation of the previous presentation of the work in the seminar (4%).
  - Job evaluation (29%).

2) The practical exercises will consist of the individual realization in the computer room of 6 exercises of follow-up of the subject and of learning of the different techniques of data analysis taught in the subject, in which they will be applied, with the help of statistical software , the treatment of statistical data following some guidelines that will guide the exercise and on which there will be answers to several questions of a questionnaire. A final average score of 4 out of 10 is required for the set of exercises. The correspondent exercises contained in these 6 techniques: 24%

- Analysis of multidimensional contingency tables (4%)
- Log-linear analysis (4%)
- Analysis of variance (4%)
- Factorial analysis of principal components and multiple correspondences (4%)
- Classification analysis (4%)

## Assessment Activities

Analysis works	66,0%	0	0	14, 13, 1, 3, 2, 11, 9, 4, 5, 15, 6, 7, 8, 10, 12, 22, 17, 18, 19, 20, 16, 21
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3) The follow-up of the course requires continued assistance to more than one constant	10%	0	0	1, 3, 2, 11, 9, 4, 5, 15, 7, 8, 10, 12, 17, 18, 19, 20, 16, 21
Follow-up of the autonomous work and compliance with the deadlines of the different activities: A minimum attendance of 80% of sessions is required. Score between 8 and 10 (between 0.8 and 1 if weighted by the 10% that represents over the total), depending on the monitoring and if the	10,0%	0	0	
Practical exercises	24,0%	10	0.4	14, 13, 1, 3, 2, 11, 9, 4, 5, 15, 6, 7, 8, 10, 12, 22, 17, 18, 19, 20,

assistance is between 80 and 100%. If 80% is not reached, it will be considered that a continuous evaluation and the abandonment of the subject has not been made.

## Bibliography

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### Basic bibliography

López-Roldán, P.; Fachelli, S. (2015). *Metodología de la investigación social cuantitativa*. Bellaterra (Barcelona): Dipòsit Digital de Documents, Universitat Autònoma de Barcelona. 1a. edició.

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López-Roldán, P. (2015). *Recursos para la investigación social*. Dipòsit Digital de Documents. Bellaterra (Barcelona): Universitat Autònoma de Barcelona. improved.

<http://hdl.handle.net/10261/83349> | <http://pagines.uab.cat/plopez>

If the score of the exercises has not been done, or the score of these is less than 4, they can be recovered. The recovery will consist

Further reading an exercise of data analysis with the software, of the same characteristics

The manual *Metodología de la investigación social cuantitativa* (MSC) contains in each chapter a list of specific bibliographic references that complement the basic bibliography..

- The recovery of both the work and the exercises will be scored on a maximum of 7.

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