

## Quantitative Research Methods in Criminology

Code: 100450  
ECTS Credits: 6

**2024/2025**

Degree	Type	Year
2500257 Criminology	OB	2

### Contact

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### Teaching groups languages

You can view this information at the [end](#) of this document.

### Prerequisites

Although it is interesting to have the basic knowledge of mathematics and statistics acquired in secondary education, the subject starts from 0.

All that is required is not being anxious about one's ability to do mathematics.

Despite this, it is recommended to have completed the Quantitative Methods Preparatory course that is scheduled from the Faculty of Sociology and Political Sciences at the beginning of September. This preparatory course is intended for social science students who have difficulties understanding mathematical and statistical reasoning.

Teaching will be taught in Catalan. Despite this, it is possible that some of the seminars will be taught in Spanish.

The teaching of the subject will be taught taking into account the perspective of the Sustainable Development Goals.

### Objectives and Contextualisation

*Quantitative Methods* is an introductory course in the analysis of statistical data as a fundamental tool in criminological research.

The general objectives of the Bachelor's Degree in Criminology are that graduates of this degree should be able to use the research methods and techniques of statistical analysis to analyze data and experiences of conflict and crime in a given social context. Within this framework, the course has the following training objectives:

- 1) To know the basic statistical concepts of descriptive statistics.
- 2) To acquire autonomy in the use of computer tools for quantitative data analysis and their application to criminology.
- 3) To carry out quantitative data analysis from a descriptive perspective and using univariate and bivariate analytical techniques.

4) To introduce students to statistical inference based on statistical sampling concepts and their consequences in criminology research.

5) To identify and to apply these concepts in criminology research projects.

This course is a continuation of the methods and techniques path within the degree. On the one hand, it follows the subject *Scientific Research in Criminology*, and it also partially follows *Data Sources in Criminology*, from the first year, in which the logic of the research process in social sciences and criminological data are presented. On the other hand, this course continues with the subject of *Data Analysis*, taught in the second semester, in which the contents of this subject and multivariate analysis are studied in depth.

## Competences

- Ability to analyse and summarise.
- Accessing and interpreting sources of crime data.
- Applying the quantitative and qualitative data collection techniques in the criminological field.
- Clearly explaining and arguing a carried out analysis about a conflict or crime problem and its responses in front of specialised and non-specialised audiences.
- Designing a criminological research and identifying the appropriate methodological strategy to the proposed goals.
- Drawing up an academic text.
- Working autonomously.

## Learning Outcomes

1. Ability to analyse and summarise.
2. Applying the quantitative and qualitative data collection techniques in the criminological field.
3. Choosing the appropriate research methodology in criminological works.
4. Drawing up an academic text.
5. Interpreting in a scientific way statistical data from the criminological field.
6. Transmitting in a reasoned manner the results of a criminological research.
7. Working autonomously.

## Content

Block I. Descriptive and inferential data analysis

*Unit 1. Descriptive statistics of one variable*

1.1. Definition: descriptive and inferential statistics

1.2. Fundamentals of univariate descriptive statistics

The concept of measurement and levels of measurement

The data and the data set

Observations and variables

Mathematical notation: the summation ( $\Sigma$ )

1.3. Elementary concepts of proportions. The concept of increment

Calculation and interpretation of a percentage

Operations with proportions

Percentage changes: the increases

Index numbers

#### 1.4. Frequency distribution tables and their graphical representation

Individual data and data grouped in intervals

Absolute, relative and cumulative frequency

Bar and pie charts

#### 1.5. Summary measures of the distribution of a variable

Measures of central tendency: mode, median and mean

Position measures: percentiles

Measures of dispersion: range, variance, standard deviation, interquartile range

Graphical representations: histograms and box plots

#### 1.6. Introduction to the normal distribution

### *Unit 2. Bivariate descriptive analysis*

#### 2.1. Contingency table analysis

Joint, marginal and conditional distributions

The contingency table as a tool for analysing the relationship between variables

The stacked bar charts

#### 2.2. Comparison of means

Descriptive statistics by group

Clustered box plots

#### 2.3. Correlation between variables and linear regression

Concepts and calculation of correlation

Concepts and calculation of the regression line

Scatterplots

### *Unit 3. Fundamentals of univariate statistical inference*

#### 3.1. Statistical sampling

The concept of sample and population

Probability and non-probability sampling

Sampling error and interval estimates

### Block II. The data analysis software

#### *Unit 4. Introduction to the programme*

- 4.1. The graphical interface
- 4.2. The structure of code in the R language
- 4.3. Interpretation and understanding of warnings and error messages
- 4.4. Objects and classes
- 4.5. Structure of the functions

#### *Unit 5. Transformations of variables*

##### 5.1. Introduction

Difference between measurement level and class. The correct assignment of the class

Factor variables and their levels. Reallocation and ordering

##### 5.2. Transformations using a single variable

Recoding

The definition of non-response

##### 5.3. Transformations using several variables

Arithmetic operations on numerical variables

Case count

Generation of variables from conditions

Case selection

Debugging of files: detection and correction of errors

#### *Unit 6. Descriptive statistics in RStudio*

- 6.1. Univariate descriptive statistics
- 6.2. Bivariate descriptive statistics
- 6.3. Graphical representations

### **Activities and Methodology**

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	19.5	0.78	2, 5, 1
Workshops	19.5	0.78	2, 5, 1, 7
Type: Autonomous			
Exam	5	0.2	2, 5, 1, 7

Exam preparation	34.5	1.38	2, 5, 1, 7
Exercices and reading	46.5	1.86	2, 3, 5, 1, 7
Group paper	25	1	2, 5, 4, 1, 6

A detailed schedule of sessions will be published on the virtual campus before the start date of the course.

Theoretical (guided) sessions:

Theoretical sessions of conceptual introduction and statistical data analysis procedures (conventional classroom).

Practical sessions (supervised):

Training sessions on statistical software and case and problem-solving practice (computer-based classroom)

Evaluation sessions (supervised):

Individual theoretical and practical tests to solve cases and problems with the computer using the statistical programme (computerised classroom).

Tutorials:

Students may receive the attention of the theory or seminar teaching staff at the agreed timetable. On the other hand, the teaching staff may set up compulsory tutorial sessions to monitor coursework.

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

### Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam I. Data Analysis with RStudio	30%	0	0	5, 1, 7
Exam II. Descriptive statistics of one variable	30%	0	0	2, 3, 5, 1, 7
Exercises	5%	0	0	2, 3, 5, 1, 7
Ongoing assessment	10%	0	0	2, 5, 7
Paper (groups)	25%	0	0	2, 3, 5, 4, 1, 6, 7

#### 1. Continuous assessment activities

A) Classroom problems and practice with the analysis programme (5%):

- At the end of each theory session and each practical session, a set of exercises and problems will be posed and must be handed in before the next session.

- No practice will be accepted beyond the deadlines, except in cases of force majeure. The practices not submitted are not recoverable and have a value equal to 0.
- The practical exercises will not be directly assessed, but the solutions will be posted on the virtual campus with detailed explanations to facilitate self-correction.

B) Follow-up of theoretical and practical sessions (10%):

- In each session, a short test will be given with questions on the contents developed during the class or on reading materials defined for the session.
- This activity cannot be made up, so that unexcused absences will have a mark of 0. If the absence has been justified, the activity will not be taken into account in the calculation of the average.

C) Examination of data processing with the analysis software (30%):

- Practical exam that will evaluate the skills acquired in data processing and the manipulation of variables and files using the software.
- In order to pass the course, a minimum mark of 4 is required. Otherwise, it will be necessary to take the final exam.

D) Examination of the concepts of univariate descriptive statistics (30%):

- Theoretical-practical exam, which will combine questions on the main concepts of univariate descriptive statistics with their application in problem solving and the use of statistical software.
- In order to pass the course, a minimum mark of 4 is required. Otherwise, it will be necessary to take the final exam.

E) Analysis work (25%):

- A paper will contain: (1) aspects of univariate inference and (2) treatment of variables and bivariate analysis.
- Guidelines for the development of the work will be set out at the beginning of this part of the course.
- The work will be carried out in groups. The number of members of the groups will be specified at a later stage.
- In order to pass the course, a minimum mark of 4 is required. Otherwise, it will be necessary to take the final exam.
- A paper that contains serious formatting problems (e.g. spelling mistakes or poor bibliographical citations) will receive a mark of 3, regardless of its content.

2. Conditions for taking part in the assessment

- In accordance with the criteria of the Degree, attendance is compulsory at 100% unless there is an excused absence. Justified absences are considered to be those due to force majeure. Absence due to academic reasons must be accepted in advance by the teaching staff. It is necessary to meet a minimum of 80% attendance to be able to pass the evaluation.
- Punctuality in class is required. Delays of more than 5 minutes not justified by force majeure will count as a failure to attend.

3. Final test within the framework of continuous assessment

Students who take part in at least 80% of the activities (sections A and B of the continuous assessment), but who get less than a 4 in any of the three continuous assessment activities (C, D or E) must take a final exam with the content of the whole course.

Students who take part in less than 80% of the activities (sections A and B of continuous assessment) are not entitled to this final exam.

4. Non-evaluable rating

Students will be evaluable as long as they carry out a set of activities whose weight is equivalent to a minimum of 50% of the total grade for the subject. If the set of evaluable activities is below this 50%, it will be considered non-evaluable.

#### 5. Fraudulent conduct

If any form of copying or plagiarism is detected in any of the assessment activities, the activity will be marked 0 and the right to re-assessment will be lost. Human or technological help in writing the results of a work will be considered plagiarism.

Cellphones will be used to evaluate the monitoring of the theory and practice sessions (section B). If it is detected that a person answers the questionnaires without being present in the classroom, he/she will have a mark of 0 in the overall evaluation of the follow-up of the sessions.

#### 6. Behaviour during the course

The UAB is home to a diverse and inclusive environment for students, teaching staff and the university community as a whole. In this class a zero tolerance policy will be applied towards any attitude of discrimination or harassment based on age, ancestry, functional diversity, gender identity, national origin, religious belief or sexual orientation, as well as towards any attitude that generates a hostile environment for any of the aforementioned reasons. Such attitudes will be reported in accordance with the university's harassment prevention policy.

#### 7. Single assessment

Students who, within the deadlines established by the faculty, take advantage of a single assessment, do not have the obligation to carry out the exercises set out in the classroom, or to deliver the RStudio practices, or to keep a daily monitoring of the course.

In this case, the evaluation will be based on a final exam on the date established by the faculty. This exam will assess the ability to work with the appropriate software, the knowledge of univariate and bivariate descriptive statistics, as well as the basic fundamentals of statistical sampling.

Students who do not pass the test will be entitled to a compensatory evaluation. In both exams a grade of 5 is necessary to pass the subject.

## Bibliography

### Basic reading

The following publications are the basic reference manuals for the subject. Although they are not compulsory reading, they are recommended.

Boccardo, Giorgio and Ruiz, Felipe (2019). *RStudio for Descriptive Statistics in the Social Sciences*. <https://bookdown.org/gboccardo/manual-ED-UCH/uso-basico-de-rstudio.html#que-es-rstudio-una-interfaz-para-u>

López-Roldán, Pedro and Fachelli, Sandra (2015). *Methodology of quantitative social research*. Universitat Autònoma de Barcelona. <https://ddd.uab.cat/record/129382>

### Complementary references

Bardina, Xavier; Farré, Mercè and López-Roldán, Pedro (2005). *Estadística: un curs introductor per a estudiants de ciències socials i humanes. Volum 2: Descriptiva i exploratòria bivariant*. Universitat Autònoma de Barcelona.

Cea D'ancona, M<sup>a</sup> Ángeles (1998) *Metodología cuantitativa. Estrategias y técnicas de investigación social*. Síntesis.

Farré, Mercè (2005). *Estadística: un curs introductori per a estudiants de ciències socials i humanes. Volum 1: Descriptiva i exploratòria univariant*. Universitat Autònoma de Barcelona.

Fox, James A.; Levin, Jack; Forde and David R. (2013) *Elementary Statistics in Criminal Justice Research*. Pearson Education.

Maxfield, Michael G. and Babbie, Earl R. (2005). *Research Methods for Criminal Justice and Criminology*. Thomson Wadsworth.

Walker, Jeffery and Maddan, Sean. (2009). *Statistics in Criminology and Social Justice: Analysis and Interpretation*. Jones and Bartlett Pubs.

#### Note

Complementary bibliography for the different parts of the programme can be found in the materials available on the Virtual Campus.

Given the eminently practical nature of the course, the readings that appear in this bibliography are not compulsory, but for consultation; they are designed to complement the explanations given in the classroom and to clarify any doubts that may arise. In addition, they will be useful for all those who, for whatever reason, are unable to attend the classes.

## Software

The free software *RStudio* will be used

## Language list

Name	Group	Language	Semester	Turn
(TE) Theory	1	Catalan	first semester	morning-mixed