

Basic Statistics

Code: 104790
ECTS Credits: 6

Degree	Type	Year	Semester
2503868 Communication in Organisations	OB	3	1

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

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

The course has no prerequisites.

Objectives and Contextualisation

The aim of the course is to provide an understanding of the fundamental principles of descriptive statistics and statistical inference, as well as to provide students with the ability to evaluate the veracity of statements made from statistical data, and to provide them with sufficient skills to make statistical inferences about a population from sample data.

At the end of the course, students should be able to:

- Use information from databases with the help of a computer.
- Present the relevant information contained in a file in a synthetic and easily understandable form, using the relevant statistical techniques of data analysis and graphical representation.
- Critically evaluate statements made on the basis of data analysis.
- Understand the basic concepts of statistical inference based on probability theory.
- Be able to construct and interpret confidence intervals and to perform and interpret hypothesis tests.

Competences

- Apply specific research methodologies to formulate hypotheses, validate and verify ideas and concepts and interpret data on communication in organisations.
- Manage time efficiently and plan for short-, medium- and long-term tasks.
- Search for, select and rank any type of source and document that is useful for creating messages.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.

Learning Outcomes

1. Apply the basic principles of audience measurement to the analysis of specific cases, using the most suitable statistical tools to correctly plan corporate communication.
2. Cross-check information to establish its veracity, using evaluation criteria.
3. Find what is substantial and relevant in documents within the subject.
4. Know all the criteria for selecting the data that will be subsequently processed in order to reach sound conclusions.
5. Submit high-quality coursework on time, which requires attention to both individual and group work.
6. Use data management systems.
7. Use the tools and models of statistical analysis.
8. Work independently, on the basis of the knowledge acquired, to resolve the exercises set and interpret the data.

Content

Block I. Descriptive analysis and introduction to statistical inference

Topic 1. Descriptive statistics with one variable

- 1.1. Definition: descriptive and inferential statistics
- 1.2. Fundamentals of univariate descriptive statistics
 - The concept of measurement and levels of measurement
 - Observations and variables
 - Elementary mathematical notation: the summation (Σ)
- 1.3. Basic concepts of proportions. The concept of increment
 - Calculation and interpretation of a percentage
 - Operations with proportions
 - Percentage changes: the increase
 - Index numbers
- 1.4. Frequency distribution tables and their graphical distribution
 - 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

Topic 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 according to groups

Clustered box plots

2.3. Correlation between variables and the regression line

Concepts and calculations in correlation

Concepts and calculation of the regression line

Scatterplots

Topic 3. Fundamentals of Statistical Inference

3.1. Statistical sampling

The concepts of sample and population

Probability and non-probability sampling

Sampling error and interval estimates

3.2. Introduction to Hypothesis Testing

Types of test error: the confidence level and the significance level

Contingency tables and the chi-square test

Comparison of means. Analysis of variance

Inference in simple linear regression models.

Block II. The Excel spreadsheet and its applicability to statistics. Other programmes

Topic 4. Introduction to the spreadsheet and its use in descriptive statistics

4.1. Data preparation and basic functions of the spreadsheet

4.2. Univariate and bivariate descriptive statistics from the spreadsheet

Working with aggregated data

Working with individual data: pivot tables

The possibilities of the spreadsheet in graphical representations

4.3. The spreadsheet and statistical inference

The chi-square and Cramer's V test

The calculation of homoscedasticity in the comparison of means. Comparison of means and analysis of variance.

Correlation and linear regression.

Topic 5. Introduction to statistical software for evaluating hypothesis testing

Methodology

From a methodological point of view, the course is divided into three parts. The theoretical content, which will be taught in lectures, the problems in the classroom, and the practical computer work, which will be carried out in smaller groups in classrooms equipped with PCs. As for the time spent on each activity, approximately 30% will be devoted to lectures, 30% to problem solving, and 40% to practical computer work.

Theoretical content and problem solving

Theoretical and problem-solving classes will be held simultaneously. In these, the content of the programme will be presented, statistical procedures will be introduced, and statistical problems will be carried out in the classroom. These sessions will be coordinated with the knowledge that will simultaneously progress in the practical sessions. For the proper functioning of the course, some exceptions may be made to this general rule.

The eminently magisterial nature of the theoretical classes will be accompanied by the practical support of problem solving. These problems will take the form of specific cases relating to the different statistical procedures used, always applied to the framework of communication in organisations or to communication in general. Students will be expected to solve the problems individually, followed by a collective discussion.

Practical computer work

These classes will be taught directly in a room equipped with computers. Students will receive advanced training in the use and application of spreadsheets to solve specific problems in the field of research in the world of communication using the computer. In addition, basic information on statistical programmes will be provided. It will be eminently practical in nature, so that all sessions will combine a brief explanation of procedures to help solve a set of practical problems. Examples and databases will be specific to the world of communication.

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Laboratory practical	20	0.8	1, 4, 5, 8, 6, 7
Masterclasses	15	0.6	4, 7
Problem solving classes/case studies/exercises	13	0.52	1, 2, 8, 3, 6, 7
Type: Supervised			
Tutorials	12	0.48	1, 2, 4, 6, 7
Work/report writing	40	1.6	4, 5, 8, 7
Type: Autonomous			
Personal study	50	2	1, 2, 3, 7

Assessment

The acquisition of knowledge will be assessed on the basis of the daily monitoring of the theoretical and practical sessions (30%), an individual written test (40%), and a data analysis project to be carried out in groups (30%). In order to pass the course, a minimum mark of 4 will be required in each of the tests, and the weighted average must be higher than 5.

Follow-up of the theory and problem sessions (15%). Achievements in the contents of the theoretical part and problems will be evaluated on a daily basis. This monitoring can be carried out in two different ways: (a) by means of tests with specific questions on the contents taught in the session; or (b) by means of exercises that will be provided at the end of the class, and which must be handed in at the next session.

Monitoring of the practical laboratory sessions (15%). Monitoring will be carried out in the same way as for the theory and problem sessions.

Individual written test (40%). At the end of all the sessions there will be a written test that will include the content of the whole course. The test will be eminently practical.

Group work (30%). Students will be given a database in order to develop a data analysis work, including both descriptive and inferential statistics aspects. The guidelines for carrying out the work, as well as the number of members of the groups, will be made explicit when the database is handed in.

Re-evaluation. As specified above, whoever has a mark lower than 4 in any of the evaluations, or has a weighted average lower than 5, will have to take a synthesis test.

Those who have not taken either the individual test or the group work, but have taken the re-evaluation, will be marked as failed in the evaluation report. On the other hand, those who take either of these two tests or the re-evaluation will be considered to have dropped the course and the final grade will be a fail.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Classroom practice	15%	0	0	1, 8, 6, 7
Internships	15%	0	0	2, 8, 3
Submission of papers	30%	0	0	1, 4, 5, 8, 6, 7
Theoretical tests	40%	0	0	1, 4, 8, 6, 7

Bibliography

Bardina, Xavier; Farré, Mercè; López Roldán, Pedro (2005). *Estadística: un curs introductor per a estudiants de ciències socials i humanes. Descriptive and exploratory bivariate statistics. Introducció a la inferència*. Col·lecció Materials 166. Universitat Autònoma de Barcelona.

Epstein, Joshua M. (2008) "Why model?"
<http://www.uvm.edu/pdodds/teaching/courses/2009-08UVM-300/docs/others/2008/epstein2008a.pdf>

Farré, Mercè (2005). *Estadística: un curs introductor per a estudiants de ciències socials i humanes. Descriptive and exploratory univariate statistics*. Col·lecció Materials 162. Universitat Autònoma de Barcelona.

López-Roldán, Pedro; Fachelli, Sandra (2015). *Methodology of Quantitative Social Research*. Dipòsit Digital de Documents, Universitat Autònoma de Barcelona. Digital edition: <http://ddd.uab.cat/record/129381>

Moore, David S. (2005). *Basic Applied Statistics* (second edition). Antoni Bosch editor.

Portilla, Idoia (2004). *Descriptive statistics for communicators. Aplicaciones a la publicidad y las relaciones públicas*, Ediciones Universidad de Navarra.

Sánchez Carrión, Juan Javier (1999). *Manual de análisis de datos*, Alianza Editorial.

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; designed to complement the explanations developed in the classroom and to clarify possible doubts. They will also be useful for all those who, for whatever reason, are unable to attend any of the sessions.

Software

Excel, a word processor and PSPP will be used.