



MATH 368E Introduction to Descriptive and Inferential Statistics

Professor: Raúl Brey

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Office Hours: By appointment (please allow at least 48 hours for your instructor to respond to your emails)

Course information:

Fall 2023

Course Description

This course is an introduction to descriptive and inferential statistics, which are useful for describing and analyzing data from a variety of fields. The topics covered include: analysis of univariate and bivariate data (including frequency distributions and graphs, measures of central tendency and variability, covariance and correlation), probability and random variables, sampling distributions, point and confidence interval estimation, and hypothesis testing (one-sample and two-sample tests of hypothesis for means, variances and proportions, Wilcoxon signed-rank test, Wilcoxon-Mann-Whitney Test, and chi-square tests). The statistical package SPSS will be used in this course.

Course Goals

This course seeks to provide students with a better understanding of statistics in the context of applied research. In particular, this course aims to:

- Introduce students to statistical techniques of data analysis.
- Increase students' awareness of the applicability of these statistical techniques to real-life cases.
- Enable students to choose the most appropriate statistical method for a data analysis problem.
- Enable students to interpret and report the results of the statistical procedures covered in this course.
- Introduce students to the use of SPSS computer software for statistical analysis.

Methodology

This course consists of 26 face-to-face sessions that blend theoretical and practical instruction in order to attain a better understanding of the content of the course. Students will be given a list of exercises for each unit. Some of these exercises will be solved in class by the instructor on the board using statistical formulae or by using SPSS. The rest of the exercises will be assigned to the students as homework and randomly selected students will explain their solutions in class.

Technical Requirements

This course requires that students have/bring their laptop, since tablets, Chromebook, or cell phones may not meet our virtual platform and software requirements.

For technical problems with Blackboard, please contact Jorge Pascual (jpasdia@acu.upo.es).



Course Materials

Textbooks are not required for this course. All necessary materials will be provided on the course website.

Complementary Bibliography

- Shafer D.S. and Zhang Z. (2012). Beginning Statistics. Creative Commons

Course Requirements and Grading

Your final grade will be calculated as follows:

- Class participation: 10%.
- In-class presentations: 40%
- Mid-term exam: 20%.
- Final exam: 30%

Exams and every other assignment will be marked following the Spanish numerical range. Here is a table to illustrate differences in conversion between the Spanish, U.S. and Standard European grading systems:

		9,9	9,4	8,9	8,4	7,9	7,4	6,9	6,4	5,9	5,4	4,9
SPAIN	10	-	-	-	-	-	-	-	-	-	-	-
		9,5	9	8,5	8	7,5	7	6,5	6	5,5	5	0
USA	A+	A	A-	B+	B	B	B-	C+	C	C	C-	F
ECTS	A	B	B	C	C	C	C	D	D	E	E	F

General Course Policies

Each student is expected to be familiar with the course syllabus. Students are expected to focus their full attention on the class, arrive on time, and stay until class ends. Leaving the classroom on repeated occasions is disturbing to both your professor and your classmates and may adversely affect your participation grade. Please make use of the 10-minute breaks in between classes to fill up your water bottle, use the restroom, etc.

Students are expected to listen and respect other points of view. Phone calls, social media, email, or Internet browsing at any time during class are not acceptable during class except for specific class-related activities expressly approved by your instructor. You are responsible for any course material covered in class, announcements, and/or handouts if you are not present for any reason. Students will be held responsible to be up to date by attending class regularly and checking both email and the Blackboard site of the course frequently (monitor your email and Blackboard announcements at least once every 24 hours).

Communicating with the instructor: Please allow at least 48 hours for your instructor to respond to your emails. The weekend is not included in this timeframe. If you have an urgent request or question for your professor, be sure to send it during the week.

Attendance and Punctuality

Attendance is mandatory in all classes. As we understand that you might fall ill or be unable to come to class (e.g. due to a religious holiday, a flight delay, a family wedding/reunion, a graduation, a job interview, etc.) at some point during the semester, you are allowed up to 4 absences. You will be responsible for the material covered and any work missed. You will not need to justify your absences (up to 4) in any way unless you miss an exam, a presentation, a quiz, etc. In this case, you must present a doctor's note (signed, stamped and dated) to be able to reschedule the exam, etc. It will still count as an absence but you will be allowed to retake the exam, etc. We don't encourage you to use all 4 days unless you really need them as your participation grade may suffer if you are not in class. If used unwisely and you get sick late in the semester, the following penalties will apply:

- On your 5th absence, 1 point will be taken off of your final Spanish grade
- On your 6th absence, 3 points will be taken off of your final Spanish grade
- On your 7th absence, you will automatically fail the class

For classes that meet once a week, each absence counts as two. For classes that meet daily, the penalties outlined above apply if you go over 6 absences (7th absence=5th absence above). Exams missed due to an excused absence must be made up within a week of returning to classes. Talk to your professor immediately after your return.

COVID-19

If an absence is related to COVID-19 the procedure to follow will be in accordance with the current legislation in the region of Andalucía, Spain.

Academic Honesty

Academic integrity is a guiding principle for all academic activity at Pablo de Olavide University. Cheating on exams and plagiarism (which includes copying from the Internet) are clear violations of academic honesty. A student is guilty of plagiarism when he or she presents another person's intellectual property as his or her own. The penalty for plagiarism and cheating is a failing grade for the assignment/exam and a failing grade for the course. The International Center may also report this to your home university. Avoid plagiarism by citing sources properly, using footnotes and a bibliography, and not cutting and pasting information from various websites when writing assignments.

Learning Accommodations

If you require special accommodations or have any other medical condition you deem may affect your class performance, you must stop by the International Center to speak to Marta Carrillo (mcaroro@acu.upo.es) to either turn in your documentation or to confirm that our office has received it. Marta will explain the options available to you.

Behavior Policy

Students are expected to show integrity and act in a professional and respectful manner at all times. A student's attitude in class may influence his/her participation grade. The professor has a right to ask a student to leave the classroom if the student is unruly or appears intoxicated. If a student is asked to leave the classroom, that day will count as an absence regardless of how long the student has been in class.



Course Contents

Unit 1. Descriptive statistics.

- 1.1. Basic concepts and definitions.
- 1.2. Analysis of univariate data: frequency distributions and graphs.
- 1.3. Analysis of univariate data: measures of central tendency.
- 1.4. Analysis of univariate data: measures of variability.
- 1.5. Analysis of bivariate data: joint frequency distributions, graphs, covariance, and correlation.

Unit 2. Probability and random variables.

- 2.1 Probability
- 2.2 Conditional probability and independence of events.
- 2.3 Random variables.
- 2.4 Discrete univariate random variables: expectation, variance, probability mass function, and cumulative distribution function.
- 2.5 Continuous univariate random variables: expectation, variance, probability density function, and cumulative distribution function.

Unit 3. Statistical inference.

- 3.1 Population and samples.
- 3.2 Sampling distributions.
- 3.3 Point estimation.
- 3.4 Interval estimation.
- 3.5 Hypothesis testing: parametric and non-parametric tests.