



## INTRODUCTION

Students will learn the fundamentals of Probability and Statistical Inference

- **Degrees:** ECO+Data Analytics, ECO/ADE+Law, ECO+IE&F, ELG
- **Module:** Quantitative Methods
- **ECTS:** 6
- **Course, Semester:** 2º Course, 1st Semester
- **Type of course:** Compulsory
- **Instructor:** Stella Salvatierra Galiano (ssalvat@unav.es)
- **Language:** English
- **Schedule/Classroom:** <https://www.unav.edu/web/facultad-de-ciencias-economicas-y-empresariales/estudiantes/horarios>

## COMPETENCES

### Basic and General Competences

BC1. Students must know how to apply their knowledge to their work or vocation in a professional way and must have the competences that are usually demonstrated by means of preparing and defending arguments and solving problems within their area of study.

BC3. Students must have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific, and ethical topics.

GC4. To use independent critical reasoning on relevant topics in economics and business.

GC8. To develop expectations, describe scenarios, and make estimates using relevant information for the company.

### Specific Competences

SC5. To apply mathematical reasoning and/or quantitative tools to the analysis of economic reality.

SC6. To judiciously use computer apps in the quantitative and/or qualitative analysis of economic and/or business matters.

SC8. To apply economic logic and/or econometric techniques to specific areas of economics.

SC15. To analyse data using software tools on specific areas of economics and/or business.

## PROGRAM



1. Introduction to Statistics
2. Notions of probability theory. Experiment. Sample space. Events. Approaches to probability. Definition of probability. Properties. Total probability law. Bayes' theorem.
3. Random variables. Definition. Types of random variables.
4. Discrete random variables. Mass function. Distribution function. Expectation. Variance. Popular distributions: Bernoulli, binomial and Poisson.
5. Descriptive Statistics
6. Continuous random variables. Density function. Distribution function. Expectation. Variance. Popular distributions: Exponential and normal.
7. Bivariate random variables. Joint mass function. Joint density function. Covariance and correlation. Distribution of the sum of independent normal random variables.
8. Statistical Inference. Central limit theorem
9. One sample tests of hypothesis
10. Two sample tests of hypothesis
11. Analysis of Variance

## EDUCATIONAL ACTIVITIES

ED1. Lectures (48 hours): theoretical and practical classes. Students are expected to take notes and use material made available through ADI.

ED2. Group assignment (16 hours). Students are required to apply the knowledge and tools learned during the lectures.

ED3. Personal study and teamwork: Study of the theory, solution of problem sets, group assignment, and clarifications during office hours (80 hours).

ED4. Evaluation: Tests/Exercises (2 hours), Midterm (2 hours) and Final Exam (2 hours).

## ASSESSMENT

Final marks will be based on:

- SE1: Ongoing evaluation
- SE2: Midterm exam (topics 2-4); October 2, 2023.
- SE3: Two group assignments; due on October 31 and November 30
- SE4: Final exam; December, date TBA;

Students must achieve at least 4 points in the final exam. Otherwise, final mark will be 4.

## DECEMBER AND JUNE

Those who get at least 6 points in the midterm exam, can choose one of the following options for the final exam:

- Final exam includes topics 6-11(only). Final Mark=  $0.1*SE1 + 0.2*SE2 + 0.15*SE3 + 0.55*SE4$
- Final exam includes topics 2-11. Final Mark=  $0.1*SE1 + 0.9*SE4$



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For those who get less than 6 points in the midterm exam, the final exam will include topics 2-11. You can choose can choose one of the following options for the final mark:

- Final Mark=  $0.1*SE1 + 0.2*SE2 + 0.15*SE3 + 0.55*SE4$
- Final Mark=  $0.1*SE1 + 0.9*SE4$

## HONESTY IS THE BEST POLICY

*(Ethics Committee Provisions Against Plagiarism and Copying)*

We value honesty. Without it, there can be no trust or any meaningful social relations. Therefore, the School expects honesty and fairness from all of its members: professors, non-academic staff, and students.

Dishonest behaviours will be sanctioned in accordance with the [University regulations regarding academic discipline](#), and include lying, cheating in exams, and plagiarism in written work. We take such violations seriously. Depending on their gravity, these offences will be dealt with by the Professor in charge of the subject, by the Dean of Students, and in very severe cases, by the Vice President for Student Affairs.

Sanctions include:

- formal warnings
- prohibition from entering University premises for a given period
- loss of admission rights to exams
- loss of scholarships
- A failing grade for the piece of work or the whole course.

## Office Hours

Dña Stella Salvatierra ([ssalvat@unav.es](mailto:ssalvat@unav.es))

Office 4060, "Edificio Amigos". Floor 4

Office hours:

- Tuesday, 10:00-11:30hs.
- Thursday: 12:30-14:00hs.

## BIBLIOGRAPHY

### References

- Newbold, P., Carlson, W.L., Thorne, B., (2012), "Statistics for Business and Economics", Prentice Hall, 8<sup>th</sup> edition. [Localízalo en la Biblioteca](#)
- Lind, D.A., Marchal, W.C., Wathen, S.A., (2015), "Estadística Aplicada a los Negocios y la Economía", McGraw Hill, 16<sup>a</sup> edición. [Localízalo en la Biblioteca](#)



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- Ross, S., (2017), Introductory Statistics, Academic Press, 4th edition. [Localízalo en la Biblioteca](#)

### Resources

For each of the chapters, the following resources will be available

- Power poing slides: available in ADI
- Exercises: available in ADI
- Data to analyse in the practical sessions: available in ADI