Estadística II / Statistics II

Grado en Economía y Negocios Internacionales

UNIVERSIDAD NEBRIJA

SYLLABUS

Course: Statistics II

Degree: Grado en Economía y Negocios Internacionales

Type: Mandatory

Languages: This course will be taught in English

Modality: In-Person and Online

Credits: 6

Year: 2nd

Semester: Fall Semester

Professors and contact information: Ainhoa Ercoreca y Carlos Maté Jiménez.

1. COMPETENCIES AND LEARNING OUTCOMES

1.1. Competencies

Basic competencies
- CB1
- CB2
- CB3
- CB4
- CB5

General competencies
- CG8
- CG9

Specific competencies
- CE9
- CE18

1.2. Learning outcomes

At the end of the course, students should have acquired the following skills:

- Ability to collect and organize data properly and effectively.
- Ability to perform exploratory data analysis.
- Ability to apply quantitative data analysis methods.
- Ability to conduct applied economic analysis using statistical techniques

2. CONTENTS

2.1. Prerequisites

None.

2.2. Description

Statistics II has 4 parts: 1. Analysis of Variance to compare three or more population means. 2. Simple Linear Regression and Multiple Regression to predict a quantitative response. 3. Analysis of Two-Way Tables to study the relationship between two categorical variables. 4. Nonparametric Statistics that do not require a normal distribution of the response variable.

2.3. Covered Topics

1. Review of Statistics I

2. Parametric hypothesis tests

- 2.1 The concept of parametric hypothesis test: null hypothesis and alternative hypothesis
- 2.2 Test statistic, type I and type II errors
- 2.3 Hyphotesis tests for means, variances and proportions
- 2.4 The p-value

3. Regressions

- 3.1 An introduction to regression analysis
- 3.2 Types of regression:
  - 3.2.1 Simple regression and multiple regression
  - 3.2.2 Linear and non-linear regression models

4. Analysis of variance

- 4.1 ANOVA
  - 4.1.1 One-way ANOVA
  - 4.1.2 Two-way ANOVA
- 4.2 ANCOVA
- 4.3 An introduction to MANOVA and MANCOVA

5. Goodness of fit tests and contingency tables

- 5.1 Introduction
- 5.2 Goodness of fit tests:
  - 5.2.1 Peason's χ^2 test
  - 5.2.2 Kolmogorov-Smirnov test
  - 5.2.3 Lilliefors test
  - 5.2.4 Shapiro-Wilk test
- 5.3 Contingency tables:
  - 5.3.1 Test for independence
  - 5.3.2 Test for homogeneity

6. Nonparametric statistics

- 6.1 Introducción
- 6.2 Test for randomness
- 6.3 Location models and the sign test
- 6.4 Test for comparing two populations
- 6.5 Test for comparing more than two populations

2.4. Individual / Group Assignments

AD1. Flipped classroom.

AD2. Projects. Students will be required to collectively work on a short project. Projects must include the application of some of the main concepts and techniques learnt during the course.

AD3. In-class tests.

2.5. Learning Activities

In-Person Learning	Hours	Attendance %
AF1 Lecture / Theoretical Foundations	**45**	**100%**
AF2 Case Studies	**9**	**100%**
AF3 Tutorial	**9**	**100%**
AF4 Individual / Group Assignments	**18**	**0%**
AF5 Online Assignments	**6**	**50%**
AF6 Extracurricular Materials	**6**	**0%**
AF7 Self Study	**57**	**0%**

Online Learning	Hours	Attendance %
AF8 Online Lecture	**12**	**50%**
AF9 Online Case Studies	**12**	**0%**
AF5 Online Assignments	**48**	**0%**
AF6 Extracurricular Materials	**18**	**0%**
AF7 Self Study	**24**	**0%**
AF10 Online Tutorial	**12**	**100%**
AF11 Individual / Group Assignments	**24**	**50%**

Methodologies:
In-Person: MD1, MD2, MD3, MD4
Online: MD1, MD2, MD3, MD4

3. GRADING RUBRICS

3.1. Grades

Grades are calculated as follows:

0 - 4.9 Fail (SS)
5.0 - 6.9 Pass (AP)
7.0 - 8.9 Notable (NT)
9.0 - 10 Outstanding (SB)

The mention of "Matrícula de Honor" may be awarded to students who have obtained a grade equal to or greater than 9.0.

3.2. Evaluation criteria

Ordinary Session

Modality: In-Person

Evaluation Criteria	Percentage
S1 Attendance and Participation	10%
S2 Individual / Group Assignments	30%
S3 Midterm Exam (On-Site)	10%
S4 Final Exam (On-Site)	50%

Modality: Online

Evaluation Criteria	Percentage
S10 Participation (Forums and Supervised Activities)	10%
S2 Individual / Group Assignments	30%
S4 Final Exam (On-Site)	60%

Extraordinary Session

Modality: In-Person

Evaluation Criteria	Percentage
S2 Individual / Group Assignments	30%
S4 Final Exam (On-Site)	70%

Modality: Online

Evaluation Criteria	Percentage
S2 Individual / Group Assignments	30%
S4 Final Exam (On-Site)	70%

3.3. Restrictions

Minimum Grade
To be able to qualify for inclusion of the above evaluation criteria percentages in the calculation of the final grade, it is necessary to obtain at least a grade of 5.0 in the final test.

Attendance
Student who have missed more than 25% class meetings (unexcused) may be denied the right to take the final exam in the ordinary session.

Writing Standards
Special attention will be given to written assignments, as well as to exams, regarding both presentation and content in terms of grammatical and spelling aspects. Failure to meet the minimum acceptable standards may result in point deduction.

3.4. Plagiarism Warning

Nebrija University will not tolerate plagiarism under any circumstances. Reproducing content from sources other than a student's own work (the internet, books, articles, and peers' work, among others) without proper citation will be considered plagiarism.

If these practices are detected, they will be considered a serious offense, and the sanctions provided for in the Student Regulations may be applied.

4. BIBLIOGRAPHY

Required Reading

- Camm, J.D., Cochran, J.J., Fry, M.J., Ohlman, J.W., and Anderson, D.R. (2023). *Statistics for Business and Economics*. Cengage Learning.
- Dalgaard, P. (2008). *Introductory Statistics with R* (2nd ed.). Springer.
- McClave, J., Benson, P., and Sincich, T. (2021). *Statistics for Business & Economics*. Pearson.
- Newbold, P., Carlson, W.L.; and Thorne, B.M. (2019). *Statistics for Business and Economics*. Pearson.

Recommended Reading

- Hollander, M., Wolfe, D. A., & Chicken, E. (2014). Nonparametric statistical methods (3rd ed.). Wiley.
- Mann, P.S. (2020). Introductory Statistics. Wiley.
- Ross, S.M. (2010). Introductory Statistics. Elsevier.
- Weiss, N.A. (2019). Introductory Statistics. Pearson.