

Academic Year: ( 2022 / 2023 )

Review date: 20-06-2022

Department assigned to the subject: Department of Statistics

Coordinating teacher: GARCIA PORTUGUES, EDUARDO

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Social Sciences and Law

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to statistics
  - 1.1. General concepts
  - 1.2. Sampling methods
  - 1.3. Introduction to visualization tools
2. Probability space
  - 2.1. Basic properties
  - 2.2. Independence and conditional probability
  - 2.3. Total probability
  - 2.4. Bayes theorem
3. Univariate statistics
  - 3.1. Visualization techniques
  - 3.2. Characteristic measures
  - 3.3. Transformations
4. Random variables
  - 4.1. Distributions
  - 4.2. Characteristic measures
  - 4.3. Transformations
  - 4.4. Examples
5. Introduction to statistical inference
  - 5.1. Population and sample
  - 5.2. Sampling distribution of a statistic
  - 5.3. The sample mean distribution
  - 5.4. Estimation and estimators
  - 5.5. Method of moments
  - 5.6. Maximum likelihood
6. Confidence intervals
  - 6.1. For the mean
  - 6.2. For the proportion
  - 6.3. For the variance
7. Hypothesis testing
  - 7.1. Introduction to hypothesis testing
  - 7.2. Type I and Type II errors
  - 7.3. Power of a Statistical Test
  - 7.4. p-value
8. Nonparametric goodness-of-fit tests
  - 8.1. Chi-square tests
  - 8.2. Kolmogorov-Smirnov tests

The program is subject to minor modifications due to the course development and/or academic calendar.

## LEARNING ACTIVITIES AND METHODOLOGY

AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems.

AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring with 100% on-site attendance.

AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK. Subjects with 6 credits have 98 hours with 0% on-site.

AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours with 100% on-site.

MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning.

MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with a teacher as tutor. Subjects with 6 credits have 4 hours of tutoring with 100% on-site.

## ASSESSMENT SYSTEM

There will be continuous evaluation by means of two partial examinations. There will be some questions about the computer sessions for those exams.

If the grade obtained at the continuous evaluation is 6 or higher, the student should not attend the final exam and his/her final grade will be the grade of the continuous evaluation. If the grade obtained at the continuous evaluation is lower than 6, the student will have to attend the final exam.

For those students that attend the final exam, the final grade will be computed giving a 40% weight to the partial examinations, and a 60% weight to the grade at the final exam.

The grade for the students attending the extraordinary examination will be the grade obtained at such an exam.

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

## BASIC BIBLIOGRAPHY

- Montgomery, D. C. and Runger, G. C. Applied Statistics and Probability for Engineers, John Wiley & Sons, 2013
- Navidi, W. Statistics for Engineers and Scientists, McGraw-Hill, 2010
- Song, T. T. Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, 2004

## ADDITIONAL BIBLIOGRAPHY

- Guttman, L., Wilks, S. S., Hunter, J. S. Introductory Engineering Statistics, Wiley, 1992
- Peña, D. Fundamentos de Estadística, Alianza Editorial, 2001
- Peña, D. Regresión y Diseño de Experimentos, Alianza Editorial, 2002