

Academic Year: ( 2021 / 2022 )

Review date: 03-06-2021

Department assigned to the subject: Department of Statistics

Coordinating teacher: MINGUEZ SOLANA, ROBERTO

Type: Compulsory ECTS Credits : 5.0

Year : 1 Semester : 1

## OBJECTIVES

- \* To know exploratory data analysis.
- \* To know concepts and properties of probability calculus and random variables.
- \* To know the estimates construction methods and the estimates properties.
- \* To understand the concept of confidence interval and its applications.
- \* To know hypotheses testing, including the notion of p-value.

Link to document

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Exploratory data analysis (EDO)
  - 1.1 Descriptive measures.
  - 1.2 Graphics and diagrams
- 2 Introduction to Probability calculus
  - 2.1 Bases of Probability theory
  - 2.2 Random variables.
  - 2.3 Distributions.
  - 2.4 Independence and transformations.
  - 2.5 Expectation.
- 3 Point estimation and interval estimation.
  - 3.1 Introduction: Estimation problems.
  - 3.2 Examples.
  - 3.3 Properties of estimators.
  - 3.4 Construction of estimators.
4. Hypothesis tests
  - 4.1 Introduction: hypothesis, errors and function of power.
  - 4.2 Wald contrast. Fisher test.
  - 4.3 p-value
  - 4.4 Ratio of likelihood test.

## LEARNING ACTIVITIES AND METHODOLOGY

The course will consist of lectures and problem-solving sessions.  
Tutorships will be scheduled according to the time of classes.

## ASSESSMENT SYSTEM

Final exam.  
Homework: particular analysis of real data (by groups of students)  
Midterm exam.

<b>% end-of-term-examination:</b>	50
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	50

## BASIC BIBLIOGRAPHY

- Wasserman, L (2004) All of Statistics, Springer-Verlag. New York.

## ADDITIONAL BIBLIOGRAPHY

- Arnold, S.F. (1990) Mathematical Statistics, Prentice Hall. New York.
- Bain, L.J. and Engelhardt, M. (2000) Introduction to Probability and Mathematical Statistics, Duxbury Classic. Boston.
- Bickel, P.J. and Doksum, K.A. (2006) Mathematical Statistics- Second edition, Holden Day. San Francisco.

- Casella, G. and Berger, R.L. (2012) *Statistical Inference - Second edition*, Wadsworth and Brooks/ Cole. San Francisco.
- Dudewicz, E.J. and Mishra, S.N. (1988) *Modern Mathematical Statistics*, Wiley. New York.
- Gibbons, J.D. and Chakraborti (2010) *Nonparametric Statistical Inference. Fifth Edition*, Marcel Dekker. New York.
- Rice, J. (2006) *Mathematical Statistics and Data Analysis. Third edition*, Brooks and Cole. San Francisco.
- Van der Vaart, A.W. (2001) *Asymptotic Statistics*, Cambridge University Press. Cambridge.