

STATISTICS I

Degree(s)	: Economics; Management
Type	: Compulsory course unit
Curricular year/semester	: 2nd year / 1st Semester
ECTS / hours per week	: 6 ECTS / 5.0 Hours
Workload per week	: 2 Theoretical x 1.5 Hours + 1 Practical x 2 Hours
Teacher responsible	: Professor Graça Maria Justina Leão Fernandes

OBJECTIVES

- To provide basic knowledge on Probability and on some of its statistical applications.
- To provide the students with the necessary skills to read and work statistical data.
- To solve simple problems with application to economics and management.
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PROGRAM

1. Probability

- 1.1 Introduction
- 1.2 Space spaces – events
- 1.3 Measure of probability. Kolmogorov axiomatic.
- 1.4 Interpretations of the concept of probability
- 1.5 Combinatorial Methods.
- 1.6 Conditional Probability. Bayes Theorem
- 1.7 Independent Events.

2. Random variable. Distribution function

- 2.1 Random variable
- 2.2 Probability Distributions.

- 2.3 Classification of random variables
- 2.4 Functions of a random variable
- 2.5 Two-dimensional random variables

3. Expected values and parameters

- 3.1 Expected Value of a random variable
- 3.2 Moments
- 3.3 Parameters of order
- 3.4 Moment Generating functions
- 3.5 Expected value and moments for two dimensional random variables

4. Discrete distributions

- 4.1 The discrete uniform distribution
- 4.2 The Bernoulli and binomial distribution
- 4.3 The Poisson Distribution

5. Continuous distributions

- 5.1 The Uniform distribution
- 5.2 The Normal Distribution
- 5.3 The Exponential, Gama and Chi-Square Distributions
- 5.4 Central Limit Theorem

6. Sampling distributions

- 6.1 Probability and statistical inference
- 6.2 Specification
- 6.3 Statistics
- 6.4 The sampling distributions
- 6.5 The distribution of the sample mean and variance.
- 6.6 Asymptotic sampling distributions
- 6.7 Sampling distribution of the proportion in Bernoulli's population.
- 6.8 Sampling of Bernoulli's population. Case of two proportions
- 6.9 Normal Population: distribution of mean
- 6:10 Normal Population: distribution of the variance
- 6:11 Normal Population: ratio of "Student"
- 6:12 Normal populations: the difference between two means
- 6:13 Normal populations: relationship between two variances



BIBLIOGRAPHY

Recommended Bibliography:

- Miller & Miller, John E. Freund? Mathematical Statistics with applications, , 8th Edition, Pearson, 2013

Optional Bibliography:

- Hogg , R.V. and Tanis, E.A. , Probability and Statistical Inference , 6th Edition , Prentice - Hall, 2001
- Newbold , Carlson and Thorne, Statistics for Business and Economics , 8th Edition , Pearson, 2013
- Murteira, B., Silva Ribeiro, C., Andrade e Silva, J., Pimenta, C., Introdução à Estatística, Escolar Editora, 2010