

Course Unit	Statistics II	Field of study	Quantitative Methods
Bachelor in	Industrial Management and Engineering	School	School of Technology and Management
Academic Year	2022/2023	Year of study	2
Type	Semestral	Semester	2
Level	1-2	ECTS credits	6.0
Code	9104-754-2202-00-22		
Workload (hours)	162	Contact hours	T - TP 60 PL - TC - S - E - OT - O -

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Maria Prudência Gonçalves Martins

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Know, select and apply the most common non parametric techniques;
2. Know, select and apply to actual problems the most basic analysis of variance models;
3. Know, select and apply to actual problems the simpler multiple regression analysis models;
4. Use the computer to manipulate data and apply statistical analysis methods.

### Prerequisites

Before the course unit the learner is expected to be able to:  
Manipulate basic statistical concepts.

### Course contents

Basic statistical concepts review. Non parametric statistics. Analysis of variance. Statistical regression analysis.

### Course contents (extended version)

1. Basic statistical concepts review:
  - Probability distributions.
  - Confidence intervals.
  - Sample size determination.
  - Hypothesis tests. p-value.
  - Type I and type II errors. Statistical power.
2. Non parametric statistics:
  - Goodness of fit tests (chi-squared and Kolmogorov-Smirnov).
  - Sign test, Wilcoxon test and Mann-Whitney-Wilcoxon test.
  - Correlation tests.
  - Randomness tests.
3. Analysis of variance:
  - One factor (random or fixed) ANOVA model.
  - Two factor (random or fixed) ANOVA models.
  - N factor ANOVA models.
4. Statistical regression analysis:
  - Simple linear regression.
  - Multiple linear regression.

### Recommended reading

1. Guimarães, R. C. & Cabral, J. S. (2010), Estatística. Verlag Dashofer Portuguesa (texto principal)
2. Pedrosa, A. C. Gama, S. M. (2018), Introdução Computacional à Probabilidade e Estatística. Porto Editora
3. Wonnacott, T. H. , Wonnacott R. J. , Introductory Statistics for Business and Economic. John Wiley & Sons
4. Iman, R. , Conover W. (1990), Modern Business Statistics. John Wiley & Sons

### Teaching and learning methods

The contents of this course will be present and discuss during presental sessions (PS) and not presental sessions (NPS). During PS problems will be solve adopting a question clarification methodology. NPS will, particularly, focus on application problems taking into account the specificity of students needs.

### Assessment methods

1. Alternative I - (Regular, Student Worker) (Final)
  - Practical Work - 60%
  - Final Written Exam - 40%
2. Alternative II - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 100%

### Language of instruction

Portuguese, with additional English support for foreign students.

### Electronic validation

Maria Prudência Gonçalves Martins	Maria Clara Rodrigues Bento Vaz Fernandes	António Jorge da Silva Trindade Duarte	José Carlos Rufino Amaro
28-02-2023	01-03-2023	17-03-2023	17-03-2023