

Course Unit	Linear Algebra and Statistics		Field of study	Mathematics and statistics	
Bachelor in	Food Engineering		School	School of Agriculture	
Academic Year	2022/2023	Year of study	1	Level	1-1
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9087-641-1201-00-22				
Workload (hours)	162	Contact hours	T -	TP -	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) Luísa Maria Lopes Pires Genésio

### Learning outcomes and competences

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

1. Understand the basis of linear algebra
2. Use some reference tools to apply basic concepts of statistics in concrete situations.
3. Formalize and implement correctly problems involving the result of random experiences.
4. Do a correct sampling. Characterize data. Apply statistic methods. Interpret the results

### Prerequisites

Before the course unit the learner is expected to be able to:  
Not applicable

### Course contents

Basic notions of Algebra: Determinants, Matrices, Systems of Linear Equations; Descriptive statistics; Probability theory; Random variables; Probability Distribution Functions.

### Course contents (extended version)

1. Determinants
  - Theorem of Laplace
  - Rule of Sarrus
  - Properties of determinants
  - Reduction to the triangular form.
2. Matrices
  - Basic concepts
  - Operations with matrices
  - Calculation of the inverse matrix
3. Linear Equation Systems
  - Rule of Cramer
  - Method of elimination of Gauss and Gauss-Jordan
4. Descriptive Statistics
  - Introduction
  - Statistics objectives
  - Types of data and measurement uncertainties
  - Population and sample
  - Statistics and central tendency measures
  - Dispersion measures
  - Graphical presentation of the frequency table
  - Other statistics
5. Probability Theory
  - Basic notions
  - Probability
  - Frequency distributions
  - Random variables
6. Probability Distribution
  - Introduction
  - Discrete distributions
  - Hypergeometric Distribution
  - Binomial distribution
  - Poisson distribution
  - Continuous distributions
  - Gauss distribution

### Recommended reading

1. Ferreira, M. & Amaral, I. (2018). Álgebra Linear: Matrizes e determinantes, Vol. I. Edições Sílabo.
2. Guimarães, R. & J. Cabral, J. (2010). Estatística. Verlag Dashöfer Portugal.
3. D'Hainaut, L. (1997). Conceitos e Métodos da Estatística. Vol. I. Fundação Calouste Gulbenkian.

### Teaching and learning methods

Expositive, demonstrative and interactive

### Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
  - Intermediate Written Test - 50%
  - Final Written Exam - 50%
2. Alternative 2 - (Regular, Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 100%

## Language of instruction

Portuguese

## Electronic validation

Luísa Maria Lopes Pires Genésio	Carlos Manuel Mesquita Morais	Elsa Cristina Dantas Ramalhosa	Paula Sofia Alves do Cabo
07-12-2022	08-12-2022	08-12-2022	13-12-2022