

Probability and Statistics

Calendar: 2nd day semester

Contact Hours: TP 45,0h; OT 7,5h

Scientific Area: Mathematics and computer science

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

This curricular unit intends to transmit the basic concepts of probability and statistics leading students to understand and apply basic statistical techniques for uni and bivariate statistical description whose purpose is to summarize and describe the most relevant aspects in a data set. It is also intended that the knowledge acquired in this curricular unit provides a solid basis for others in this study cycle. The theoretical approach will always be possible followed by examples related to engineering applications.

Syllabus:

1 - Revisions:

I) Univariate Descriptive Statistics.

II) Calculation of Probabilities

2 - Bivariate Statistics:

Scattergram. Double Entry Tables and Contingency. Coefficients and Measures Association. Correlation Coefficients. Simple Linear Regression. Least Squares Method: regression line. Coefficient of determination.

3 - Random Variables and Probability Distributions:

Variables and Discrete Distributions. Bernoulli process. Binomial Distribution and Poisson. Binomial approximation to the Poisson distribution. Hypergeometric distribution. Uniform distribution. Variables and Continuous Distributions. Normal distribution. Approximation of Binomial Distribution by the Normal. Chisquare, Student t, Snedecor F-distribution.

4 - Statistical Inference

Estimation and Interval. Confidence intervals for the population mean and proportion. Hypothesis Testing.

Evidence of the syllabus coherence with the curricular unit's intended learning outcomes:

Fundamental notions of sampling theory and probabilistic discrete and continuous models will be addressed. The curricular unit addresses the statistical inference with reference to point estimation, the estimation of confidence intervals and hypothesis testing. The theoretical approach will always be followed by examples related to engineering applications. The content is therefore in accordance with the curricular unit's objectives.

References:

- Bento, M. (2010). Introdução à Estatística. Escolar Editora.
- Gama, S.; Pedrosa, A. (2007). Introdução Computacional à Probabilidade e Estatística. Porto Editora.
- Guimarães, R. C.; Cabral, J. A. S. (1999). Estatística. McGraw-Hill.
- Wackerly, D. D., Mendenhall, W. & Scheaffer, R. L. (1996) Mathematical Statistics with Applications. 5ª Ed., Boston: PWS-Kent Publishing Company.
- Robalo, A. (1998). Estatística Exercícios - Probabilidades, Variáveis Aleatórias. Volume I. Edições Silabo.
- Robalo, A. (2004). Estatística Exercícios – Distribuições, Inferência Estatística. Volume II. Edições Silabo.
- Paulino, C. (2006). Exercícios de Probabilidades e Estatística. Escolar Editora.