COMPLEMENTOS DE ESTATÍSTICA E INVESTIGAÇÃO OPERACIONAL

Code: 29900

Main Scientific Area: Statistic

Lecturer: Mário João Freitas Sousa Basto

Language of Instruction: Portuguese

Regime: S2

Contact Hours: 30h Total Workload: 130h

ECTS: 6,0

Objectives

This course is intended to sensitize the students to the importance of the correct resolution of real problems that nowadays, increasingly tend to be of large numbers, and to assist in the resolution of decision problems.

With focus on Statistics, it is intended to provide students with the main uni and multivariate techniques used in data analysis and processing, as well statistical inference, using appropriate software. It pretends to get data analysis skills to formalizing, solving, and interpreting relevant problems.

Operations Research, by providing a scientific and structured approach to decision-making, aims to contribute to solving complex problems in the operations of an organization, usually in a situation of scarce resources. It also aims to represent real-world systems, using mathematical models and algorithms from an optimization perspective.

Learning Outcomes

Perform, interpret and make decisions based on confidence intervals and hypothesis testing; identify interdependent variables and predictor and dependent variables; reduce the dimensionality of the data; build estimation and prediction models using linear regression.

Solve linear optimization, integer optimization, network optimization and queue problems.

Course Contents

1. Statistics Complements

1.1 Introduction to Multivariate Analysis

1.2 Hypothesis Testing and Analysis of Variance

1.3 Principal Component Analysis and Factorial Analysis

1.4 Linear Regression

2. Operations Research Complements

2.1 Linear optimization and integer optimization

2.2 Network Optimization

2.3 Queue problems

Recommended Bibliography

Maroco, J.; (2018); Análise Estatística com o SPSS Statistics, 7ª Edição, ReportNumber.

Bronson, R., Naadimuthu, G. (2001),Investigação Operacional, McGraw-Hill, Portugal.

Tavares, L. V., Oliveira, R.C., Themido, I.H. e Correia, F.N. (1996),Investigação.Operacional, McGraw-Hill, Portugal.

Learning and Teaching Methods

The contents covered in the Statistics Complements will provide students with skills and knowledge of data analysis methodologies that will allow, with a focus on a particular practical objective, to reduce the complexity of the data, identifying the variables that influence or may influence a given response, make predictions, analyze possible interactions between variables, contributing to making quick and better decisions.

The contents of Operations Research, covering three different sub-themes, allow students to develop their calculation and logical and abstract reasoning skills, acquiring the necessary knowledge for decision-making in the most diverse domains, with a special focus on Industrial Engineering and Management.

Assessment Methods

The evaluation contemplates the realization of two tests or works, one concerning to statistical complements (T1) and the other to operational research (T2) and participation and attendance (A). The final grade (NF) will be given by NF=45%T1+45%T2+10%A.

The grade improvement exam is a written test, to demonstrate students' competences.