

FUC - Ficha de Unidade Curricular

Curricular Unit's File

Code	L5023
Name (PT)	Optimização
Name (EN)	Optimization
Regime	Semestral
Level	1.º Ciclo
Teaching language	Português , Inglês
School	Escola de Tecnologias e Arquitectura (ISTA)
Departament	DM
Scientific area	Matemática (Mat)
Responsible academic staff	Luís Carlos Costa Pinheiro de Carvalho
Pre-requisites	N.A.
Objectives	This course intends to develop mathematical techniques, in particular techniques for solving practical managerial and economic problems.
Learning outcomes	At the end of this course the student shall be able to: 1. Solve optimization problems in R^n . 2. Solve exercises of series. 3. Solve problems of integral calculus in R and ordinary differential equations. 4. Apply linear programming techniques with and without the use of software. 5. To apply the concepts of this course in mathematical formulation of optimization problems.
Syllabus	1. Complements of differential calculus in R^n 1.1 Summary of extremes in R . 1.2 Extremes of functions of more than one variable. 1.3 Conditioned Extremes of functions of more than one variable. 2. Series 2.1 Definitions and examples 2.2 Convergence of series 2.3 Series of functions and power series 3. Integral calculus in R 3.1 Calculus of anti-derivatives 3.2 Riemman Integral definition 3.3 Calculation of integrals 3.4 Indefinite integrals 3.5 Improper Integral 3.6 Calculation of areas. 4. Introduction to ordinary differential equations (ODE): 4.1 Definitions and generalities 4.2 Separable first-order ODE 4.3 Homogeneous first-order ODE 4.4 Linear first-order ODE 4.5 Bernoulli equation 5. Linear Programming 5.1 Introduction 5.2 The simplex method 5.3 Special cases: problems with redundant, infeasible and boundless solutions 5.4 Sensitivity analysis

Assessment	<p>Students may choose among continuous assessment or assessment by examination.</p> <p>Continuous assessment consists:</p> <ol style="list-style-type: none"> 1. Midterm test (30%) 2. Group assignment (20%) 3. Final test (50%) <p>Minimum grade of 8 (out of 20) for the midterm and final test.</p> <p>Assessment by examination consists of doing an exam in the 1st examination period.</p> <p>Students who have failed may take the exam at the 2nd examination period.</p> <p>Students are required to take an oral exam, if the grade is higher than 16.</p>
Teaching methodology	<p>LM1. Expository: presentation of the theoretical concepts.</p> <p>LM2. Participative: solving exercises.</p> <p>LM3. Active: Group assignment.</p> <p>LM4. Autonomous work: individual study should be complemented with the bibliography and by solving exercises and problems given by the lecturer, according to the class planning.</p>
Demonstration of the syllabus coherence with the curricular unit's objectives	<p>The consistency of program with the learning goals (LG) is the following:</p> <p>LG1 - CP1 Extremes of functions with more than one variable</p> <p>LG2 - CP2 Series</p> <p>LG3 - CP3 e CP4 Integrals and ODE</p> <p>LG4 - CP5 Linear Programming</p> <p>LG5 - CP1 a CP5</p>
Demonstration of the coherence between the teaching methodologies and the learning outcomes	<p>The main links between the learning-teaching methodologies and goals are the following:</p> <p>LM1 - LG1, LG2, LG3, LG4 e LG5.</p> <p>LM2 - LG1, LG2, LG3, LG4 e LG5.</p> <p>LM3 - LG1, LG2, LG3, LG4 e LG5.</p> <p>LM4 - LG1, LG2, LG3, LG4 e LG5.</p>
Main Bibliography	
Complementary Bibliography	