



Polytechnic Institute of Viseu

School of Technology and Management of Viseu

Course title	Operational Research		
Scientific area	Mathematics		
Teaching method	During the course many different teaching methods will be used: self study, case studies, lectures, discussions.		
Lecturers:	Cristina Peixoto Matos Joana Fialho Paula Sarabando	Language of instruction	English
ECTS	4	Semester	Spring
Hours per week	2	Hours per semester	26 TP
Objectives of the course	<p>In Game Theory, the student will learn how to formulate, analyze, and find solutions (strategies) satisfactory for all actors in situations of conflict / sharing (social, economic, political, military, etc.) through language and the logical method / analytical mathematics.</p> <p>At a personal level it develops: rigorous and clear written and oral expression; competence in the use of computational tools; individual initiative and team work; research and autonomous learning capacity; critical spirit.</p> <p>The interdisciplinary nature of this course makes it appealing to students of management, computer science, economics, mathematics, political science, statistics, etc.</p> <p>It is intended:</p> <ul style="list-style-type: none"> - Emphasize the importance of operational research methods in more diverse areas; - Promote the development of the ability to translate into a mathematical formulation problems presented in non-mathematical language; - Promote the development of the capacity to analyze mathematically problems of the areas of economy and management with a view to obtaining the best solutions. - Identify problems from several areas that can be placed, and place them, under the mathematical formulation of linear programming; - Identify network optimization problems, namely transportation and affectation, adopting appropriate procedures to solve them. 		
Entry requirements	Does not apply.		
Course contents	<p>Introduction and examples, game representation</p> <p>Zero-sum games</p> <p>Minimax theorem</p> <p>Dominance and interactive dominance</p> <p>Nash equilibrium</p> <p>Applications: Duopoly models</p> <p>What Is Operations Research?</p>		

	<p>Modelling with Linear Programming Transportation Problems and Its Variants Network Optimization</p>
Assessment methods	<p>Class work: 10,0% Work presentation: 10,0% Final Exam: 80,0%.</p>
Recommended readings	<ul style="list-style-type: none"> • Ferguson, T. S. (2020). Game Theory. Math Department, UCLA. Available on the author's webpage. • Gibbons, R. (1992). A Primer in Game Theory. Prentice-Hall. • Klemperer, P. (2004). Auctions: Theory and Practice. Princeton: U. P. • Mesterton M. & Gibbons, (2000). An Introduction to Game-Theoretic Modelling (Chapter 4). American Mathematical Society. • Gillman R. & Housman D. (2009). Models of Conflict and Cooperation, American Mathematical Society. • Hillier, F.S., Lieberman, G.J. (2012). Introdução à Pesquisa Operacional (9ªedição). McGraw Hill • Taha, H. A. (2017). Operations research an introduction (Tenth edition). Boston: Pearson [519.8 TAH] • Ravidran,A., Don T. Philips e J. James Solberg, Operations Research - Principles and Practice, John Wiley & Sons-New York, 1987 [519.8 RAV OPE]
Additional information	