



## IDENTIFYING DATA

### Operational research in the trading company

Subject	Operational research in the trading company			
Code	V06G270V01707			
Study programme	Grado en Comercio			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	#EnglishFriendly Spanish			
Department				
Coordinator	Lorenzo Picado, Leticia			
Lecturers	Gómez Rúa, María Lorenzo Picado, Leticia			
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General description	In business, decisions must be made. Operations research techniques constitute a set of tools that allow optimal decisions to be made based on the available information. In this subject, the main methods of operations research are reviewed in an introductory way, including their principles of operation, algorithms, interpretation of the results, and practical application. The approach is eminently practical and applied, and it is intended that the student will be able to identify the situations in which each technique is appropriate, and to apply it autonomously to solve real problems.			

Translated with DeepL.com (free version)

English Friendly subject: International students may request from the teachers: a) resources and bibliographic references in English, b) tutoring sessions in English, c) exams and assessments in English.

## Training and Learning Results

Code	
C15	CE15. To know and apply the quantitative methods of operations research for decision making in the area of commerce, as well as the design and analysis of surveys through probabilistic sampling for carrying out market research.
C21	CE21. To identify and solve model problems applied to economic situations through application of appropriate mathematical techniques, as well as to interpret the solutions provided by the model.
D3	CT3. Ability to learn and work independently, and work planning and organization skills.
D4	CT4. Analysis, synthesis and critical-thinking skills.
D6	CT6. Ability to make decisions and solve problems.

## Expected results from this subject

Expected results from this subject	Training and Learning Results	
Know and apply quantitative methods of operative investigation for the taking of decisions in the field of the trade.	C15	D4
	C21	D6
Identify situations in which it is necessary to take decisions in complex surroundings and recognise the applicable models.	C15	D3
	C21	D4
Resolve practical problem with the distinct methods of operative investigation.	C15	D6
	C21	

## Contents

Topic	
Lesson 1. Introduction to operational research techniques applicable in the field of commercial companies. Programming and optimization.	1.1. Linear programming problem 1.2. Simplex algorithm 1.3. Sensitivity analysis

Lesson 2. Distribution and allocation models.	2.1. The transportation problem 2.2. The assignment problem
Lesson 3. Activity planning models: graph theory.	3.1. Introduction to graph theory 3.2. The shortest path problem 3.3. The maximum flow problem 3.4. Project planning
Lesson 4. Negotiation models: game theory.	4.1. Cooperative games with transferable utility 4.2. Stable Solutions: The Kernel 4.3. Fair Solutions: The Shapley Value
Lesson 5. Other operational research models	5.1. Other operations research models. 5.2. Relationship between the different operations research problems and cooperative game theory.

## Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	1	0	1
Lecturing	18	25	43
Laboratory practical	10	10	20
Problem solving	10	10	20
Autonomous problem solving	0	22	22
Essay questions exam	2	10	12
Essay questions exam	2	10	12
Essay questions exam	2	18	20

\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

## Methodologies

	Description
Introductory activities	On the first day of class, the teaching guide will be explained in detail, with special emphasis on the evaluation system.
Lecturing	Each model will be explained according to the theoretical principles, the hypotheses of the model, the operation of the algorithms, and the correct interpretation of the results.
Laboratory practical	The solver complement of Excel will be explained in order to solve linear programming problems.
Problem solving	The teacher will explain each of the methods by solving several applied examples.
Autonomous problem solving	The student must solve problems similar to the cases used as an example, individually or in small groups.

## Personalized assistance

Methodologies	Description
Problem solving	During the problem solving classes, all doubts that may arise from modeling problems and applying algorithms will be solved.
Autonomous problem solving	Students will be able to solve their doubts with the teachers during tutoring hours.
Laboratory practical	During the practices in the computer room, students will be able to resolve any doubts that may arise from the use of the Excel solver add-in.

## Assessment

Description	Qualification	Training and Learning Results	
Essay questions exam Essay questions exam from lessons 1 and 2.	30	C15 C21	D3 D4 D6
Essay questions exam Essay questions exam from lessons 3, 4, and 5.	30	C15 C21	D3 D4 D6
Essay questions exam Final exam.	40	C15 C21	D3 D4 D6

## Other comments on the Evaluation

As an alternative to the continuous assessment system, students may choose to be assessed with a final exam that will account for 100% of their grade. This would apply to both the ordinary and the extraordinary calls. The deadlines for renouncing to continuous evaluation will be set by the professors.

In the end of degree call, a final exam will be carried out, which will account for 100% of the grade. The official dates of the exams can be consulted on the faculty website <https://fcomercio.uvigo.es/>.

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**Sources of information**

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**Basic Bibliography**

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W.L.WINSTON, **Investigación de Operaciones**, Ed. Thompson, 2004,

HAMDY A. TAHA, **Investigación de Operaciones**, Ed. Pearson Educación, 2012,

**Complementary Bibliography**

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M.S. BAZARAA, J.J. JARVIS, H.D. SHERALI, **Linear Programming and Network Flows**, Wiley, 2010

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**Recommendations**

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