COURSE DATA

DATA SUBJECT

Code: 35830
Name: Distribution optimization
Cycle: Undergraduate Studies
ECTS Credits: 4.5
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1313 - Degree in Business Management and Administration	Facultat d'Economia	4	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1313 - Degree in Business Management and Administration	Optatividad Dirección de Operaciones y Logística	ELECTIVES

COORDINATION

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SUMMARY

The main objective of this subject is for students to learn to formulate and solve real situations through mathematical models in the context of Optimization. The aim is to train students in mathematical tools for decision making in several critical aspects of business management, especially in the industrial context. Problems of distribution, transportation, location of service centers and design of distribution routes will be studied.

In order to achieve this knowledge, the student will be trained in the construction of mathematical models that reflect these problems, in the implementation of these models in computer programs, and in the extraction of maximum information from the solutions to make optimal decisions and propose effective improvements. In summary, the subject will prepare students to solve complex real problems or situations with mathematical and computer tools.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Those corresponding to the first-year Mathematics II course.

COMPETENCES / LEARNING OUTCOMES

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Be able to apply analytical and mathematical methods for the analysis of economic and business problems.

Be able to define, solve and present complex problems systemically.

Be able to express oneself in formal, graphic and symbolic languages.

Be able to learn autonomously.

Be able to make decisions.

Be able to solve problems.

Be able to understand and use the different quantitative and qualitative methods to reason analytically, evaluate results and predict economic and financial parameters.

Be able to work in a team.

Demonstrate capacity for analysis and synthesis.

Demonstrate oral and written communication skills in the native language.

Have critical and self-critical capacity.

DESCRIPTION OF CONTENTS

1. Introduction

Operational research in the company. Mathematical models and classification. Modeling problems in operations. Resolution techniques. Applications.

2. Linear programming models

Introduction. Linear programming model. The Simplex algorithm. The interior point algorithm. Integer linear programming model. Resolution of linear programming models with computer packages.

3. Transport model and its variants

Transport model. Mathematical properties of the transportation problem. Allocation model. Transport model with transshipment. Multidimensional transport model. Applications.

4. Network models

Introduction. Network definitions and models. Shortest route model. Maximum flow model. Minimum cost flow model. Applications.

5. Transport models and facility location models

Introduction. Routing transportation model. P-median location model. Location-coverage model. P-center model. Applications.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours

Theory	22,50
Computer classroom practice	22,50
Total hours	**45,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	12,00
Independent study and work	26,00
Preparation of lessons	20,00
Preparation for assessment activities	5,00
Resolution of case studies	4,00
Total hours	**67,00**

TEACHING METHODOLOGY

The development of the subject is structured in a session of theory per week of an hour and a half of duration, and in a practice session of the same duration.

Lectures:
The teacher will highlight the main aspects and those more difficult to understand, perform exercises and the study guide students through the materials available in the virtual classroom and reference manuals. After the class, the materials needed for the next class will be indicated, so that students can prepare for the session

Practical classes:
Practical classes primarily addressed issues related to modeling, computer resolution and interpretation, applying all relevant theory, the results obtained. Professor resolve some previously proposed models and performing other for subsequent classes. In each class, students should be able to defend the adequacy of its own model and to take decisions in the light of the results.

Theoretical and practical classes are completed with the proposed individual exercises and / or equipment which shall be modeled, solved with a computer and they interpret solutions to problems in the field of operations management.

EVALUATION

a) Continuous assessment (4 points)
It is based on the student's attendance, participation and involvement in the teaching-learning process and in the practical activities carried out by the student during the semester, including individual and group work, and the defense of the positions developed by the student.
It consists of the study of practical cases, their mathematical modeling, their resolution with computer and the interpretation and discussion of the results obtained and, if appropriate, it can also contain theoretical-practical exercises. These activities can be retaken.

b) Final exam (6 points)
The final exam will consist of theoretical and practical questions and problems to be solved with a computer.

The final mark will be obtained from the sum of the final exam grade plus the continuous assessment grade. Logically, to pass the course the student must obtain a final mark greater than or equal to 5 points.

REFERENCES

Básica

¿ Ballow, R.H. (2013): Logística: Administración de la cadena de suministro. Pearson Prentice Hall

¿ ¿ Chopra, S & Meindl, P. (2008): Administración de la cadena de suministro. Estartegia, planeación y operación. Pearson Prentice Hall

¿ Font, B (2009): Programación matemática para la economía y la empresa. 2ª Edición. Laboratori de Materials, 1. Valencia, PUV.

¿ Ghiani, G. Laporte, G. & Musmano, R. (2013). Introduction to logistics systems management. Second Edition. Wiley.

¿ Hillier, F.S. & Liberman, G.J. (2015): Introducción a la investigación de operaciones. McGraw- Hill. Séptima Edición

¿ Sierksma, G. & Zwols, Y. (2015): Linear and integer optimization. Theory and practice. Third Edition. CRC Press.

¿ Taha, H.A. (2012): Investigación de operaciones. Pearson Prentice Hall

Complementaria

¿ Bazaraa, M.S. & Jarvis, J.J. (1981): Programación lineal y flujo en redes. Ed. Limusa. México

¿ Mocholí, M. & Sala, R. (1993): Programación Lineal. Metodología y problemas. Ed. Tebar Flores. Madrid.

¿ Mocholí, M. & Sala, R. (1999): Decisiones de optimización. Ed. Tirant lo Blanc. Valencia.

¿ Prawda, J (2000): Métodos y modelos de la investigación de operaciones. Ed. Limusa. Mexico

¿ Thompson, G.L. & Thore, S.(1992): Computational Economics. Ed. Scientific Press. San Francisco.

¿ Williams, H.P.(2013): Model building in Mathematical Programming. Ed. John Wiley & Sons. New York.

¿ Winston, W.L. & Albright, S.C. (2014): Practical Management Science. 5th Edition. Cengage Learning