

**COURSE DATA****Data Subject**

<b>Code</b>	36529
<b>Name</b>	Supply Chain Management and Planning
<b>Cycle</b>	Grade
<b>ECTS Credits</b>	6.0
<b>Academic year</b>	2022 - 2023

**Study (s)**

<b>Degree</b>	<b>Center</b>	<b>Acad. year</b>	<b>Period</b>
1332 - Degree in Business Intelligence and Analytics	Faculty of Economics	4	First term

**Subject-matter**

<b>Degree</b>	<b>Subject-matter</b>	<b>Character</b>
1332 - Degree in Business Intelligence and Analytics	25 - Producción y Logística	Obligatory

**Coordination**

<b>Name</b>	<b>Department</b>
PLANA ANDANI, ISAAC	257 - Business Mathematics

**SUMMARY**

The subject “Supply Chain Planning and Management” is a compulsory semester subject taught in the fourth year, second semester, of the Bachelor's Degree in Business Intelligence and Analytics/BIA.

In this course, the various optimisation problems related to the supply chain are studied. The supply chain includes all the phases involved, directly or indirectly, in satisfying customer demand. Today's economy, with increasingly competitive markets, requires increasingly efficient supply chain management. Companies have to solve the problem of having the right amount of materials and products at the right time and in the right place to avoid unnecessary costs.

The activities to be optimised in supply chain management include inventory management, the location of the various facilities, the design of the transport network and the distribution of products.



Inventory management plays an important role in the management of company resources. Keeping inventories at a minimum level while ensuring good customer service and efficient production requires the development of appropriate models to manage these inventories under various circumstances.

The transport and distribution of products, if not properly managed, can be the cause of large cost overruns, excessive pollutant emissions and customer dissatisfaction. This problem arises in business in a wide variety of different situations, and it is important to know the appropriate models and tools to be able to optimise distribution processes.

This course aims to provide students with a set of methods, models and tools that will enable them to improve the management of the supply chain in the business environment.

## PREVIOUS KNOWLEDGE

### Relationship to other subjects of the same degree

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

### Other requirements

Prior knowledge corresponding to the subject "Modelos avanzados de Investigación Operativa" is assumed. This knowledge includes, among others, the basic concepts of optimisation, modelling and algorithm design.

## COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

### 1332 - Degree in Business Intelligence and Analytics

- Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.
- Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.
- Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.
- Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.
- Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.
- Acquire basic training that can be used to learn new methods and technologies and to adapt to new situations in academic and professional areas.



- Be able to solve problems and to communicate and spread knowledge, skills and abilities, taking account of the ethical, egalitarian and professional responsibility of the activity of business intelligence and analytics.
- Be able to produce models, calculations and reports, and to plan tasks in the specific field of business intelligence and analytics.
- Be able to access and manage information in different formats for subsequent analysis in order to obtain knowledge through data.
- Be able to make autonomous decisions in digital environments characterised by the abundance and dynamism of data.
- Know and know how to properly use the appropriate quantitative and qualitative methods to reason analytically, evaluate results and predict economic and financial magnitudes.
- Be able to apply analytical and mathematical methods for the analysis of economic and business problems.
- Demonstrate skills for analysis and synthesis.
- Be able to analyse and search for information from diverse sources.
- Be able to learn autonomously.
- Be able to use ICT, both in academia and in professional practice.
- Be able to define, solve and present complex problems systemically.
- Be able to work in a team demonstrating commitment to quality, ethics, equality and social responsibility.
- Apply methods and techniques of analysis, synthesis and graphical representation by means of software tools.
- Know different production problems and their relationship with other company processes.
- Know the tools to plan, manage, implement and evaluate production systems and operations.
- Tackle problems of management and coordination of the different components of the logistics system by selecting and applying relevant analytical methodologies, strategies and technologies to decision-making.

### **LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)**

At the end of the teaching-learning process, the student will have learnt to:

- Analyse the different components of the integral logistics system of a company.
- Know the different general models applicable to logistics.
- Implement the models in different optimisation tools.
- Recognise the relevant information of a company's logistics system.
- Establish the appropriate models and solution methods for each company through joint work with different agents involved in logistics.
- Solve problems related to inventory management and prepare reports.



## DESCRIPTION OF CONTENTS

### 1. Introduction to supply chain management

Basic concepts. Basic problems: shortest path, bin-packing, aggregated planning...

### 2. Inventory management

Basic concepts. Determination of safety stock. Stocks with continuous demand. Stocks with discrete demand.

### 3. Location problems

Classification. Plant location problems. Covering location models.

### 4. Vehicle routing problems

Classification. Basic models of routing problems. Routing problems with capacities. Routing problems with time windows.

### 5. Long-distance freight transportation

Flow problems. Network design. Vehicle allocation problems.

## WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	30,00	100
Computer classroom practice	30,00	100
Development of individual work	15,00	0
Study and independent work	15,00	0
Preparation of evaluation activities	30,00	0
Preparing lectures	15,00	0
Preparation of practical classes and problem	15,00	0
<b>TOTAL</b>	<b>150,00</b>	



## TEACHING METHODOLOGY

**Theory classes:** The lecturer will develop the theoretical contents of each subject, will give model examples and will guide the students' study through the materials available in the virtual classroom and the reference manuals. At the end of the class, the materials needed for the following class will be indicated, so that the student can prepare the session.

**Practical classes:** The practical classes will fundamentally deal with aspects related to the different models and procedures studied in the theory, algorithm design, resolution with computer and interpretation of the results obtained. The student, under the guidance of the lecturer, will carry out the different exercises proposed in class, which will include, among others, the case studies, problem modelling and solving using the appropriate computer tools, and the application of resolution algorithms.

Classes of both theory and practice, will be taught in Valencian.

## EVALUATION

### a) Continuous Assessment (4 points)

It will evaluate the participation and involvement of the student in the teaching-learning process and the practical activities developed by the student during the course, based on the elaboration of individual and/or group work.

### b) Final exam (6 points)

The final exam may contain theoretical-practical problems and problem modelling and solving using the necessary computer tools.

In order to pass the subject, it will be necessary to pass the final exam. In this case, the final mark (out of 10) will be obtained as the sum of the mark of the final exam plus the mark of the continuous assessment. Otherwise, the final mark cannot exceed 4.5 points. The subject will be considered passed when the final mark is at least 5 out of 10.

## REFERENCES

### Basic

- C. Bozart, R.B. Handfield, Introduction to Operations and Supply Chain Management, Prentice Hall, 3ª edición, 2012
- S. Chopra, P. Meindl, Supply Chain Management. Strategy, Planning, and Operation, Prentice Hall, 5ª edición, 2012
- J.P. García, M. Cardós, J.M. Albarracín y J.J. García. Gestión de stocks de demanda independiente. Universidad Politécnica de Valencia, 2004





- G. P. Ghiani, G. Laporte y R. Musmanno, Introduction to Logistics Systems Management. Wiley, 2013
- M. Hugos, Essentials of Supply Chain Management, Wiley, 4ª edición, 2018
- R.J. Tersine. Principles of Inventory and Materials Management, Prentice Hall, 4ª edición, 1994
- W.L. Winston, S.C. Albright, Practical Management Science, South-Western College Pub, 5ª edición, 2013

#### **Additional**

- N. Fernández, J. García, J. Martínez, L.A. San José, Gestión de Stocks: Modelos de Optimización y Software, Universidad de Valladolid, 1999
- F.S. Hillier, G.J. Lieberman, Investigación de Operaciones, McGraw-Hill. 9ª edición, 2010
- S. Nahmias, Production and Operations Analysis, McGraw Hill. 6ª edición, 2013
- C.T. Ragsdale, Spreadsheet modeling and Decision Analysis: A Practical Introduction to Management Science, South-Western College Pub, 7ª edición, 2014
- A. Ruiz Jiménez, J. A. Domínguez Machuca, M. J. Álvarez Gil, M. A. Domínguez Machuca, S. García González, Dirección de Operaciones: Aspectos Estratégicos en la Producción y los Servicios. Mc Graw-Hill, 1995
- A. Ruiz Jiménez, J. A. Domínguez Machuca, M. A. Domínguez Machuca, S. García González, M. J. Álvarez Gil, Dirección de Operaciones: Aspectos Tácticos y Operativos en la Producción y en los Servicios. Mc Graw-Hill 1994
- E.A. Silver, D.F. Pyke, R. Peterson, Inventory Management and Production Planning and Scheduling, Wiley, 3ª edición, 1998
- H.A. Taha, Investigación de Operaciones, Pearson/Prentice Hall, 9ª edición, 2012