



POLITÉCNICA

INTERNATIONAL
CAMPUS OF
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COORDINATION PROCESS OF
LEARNING ACTIVITIES
PR/CL/001



E.T.S. de Ingenieros
Industriales

ANX-PR/CL/001-01

LEARNING GUIDE

SUBJECT

53001405 - Supply Chain Management

DEGREE PROGRAMME

05BC - Master Universitario En Ingenieria Quimica

ACADEMIC YEAR & SEMESTER

2025/26 - Semester 1

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1. Description

1.1. Subject details

Name of the subject	53001405 - Supply Chain Management
No of credits	3 ECTS
Type	Compulsory
Academic year of the programme	Second year
Semester of tuition	Semester 3
Tuition period	September-January
Tuition languages	English
Degree programme	05BC - Master Universitario en Ingeniería Química
Centre	05 - E.T.S. De Ingenieros Industriales
Academic year	2025-26

2. Faculty

2.1. Faculty members with subject teaching role

Name and surname	Office/Room	Email	Tutoring hours *
Ruth Carrasco Gallego (Subject coordinator)	LabINGOR@E TSII	ruth.carrasco@upm.es	W - 15:30 - 17:00 Th - 13:30 - 15:00 F - 14:00 - 17:00 Office hours: Please fix an appointment first via email. Face-to-face office hours at "Laboratorio de Ingeniería de Organización"(3rd

			floor above the library). Online office hours via MS Teams.
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* The tutoring schedule is indicative and subject to possible changes. Please check tutoring times with the faculty member in charge.

2.3. External faculty

Name and surname	Email	Institution
Marina Arrieta	m.arrieta@upm.es	ETSI Industriales UPM, Department of Chemistry & Environmental Engineering. EELISA The Regenerative Campus community

3. Prior knowledge recommended to take the subject

3.1. Recommended (passed) subjects

- Gestión De La Producción

3.2. Other recommended learning outcomes

- Please refer to section 5.1. Brief Description of the subject. Recommended prior knowledge for this course is detailed there.

4. Skills and learning outcomes *

4.1. Skills to be learned

CB8 - Que los estudiantes sean capaces de integrar conocimientos y enfrentarse a la complejidad de formular juicios a partir de una información que, siendo incompleta o limitada, incluya reflexiones sobre las responsabilidades sociales y éticas vinculadas a la aplicación de sus conocimientos y juicios

CE10 - Adaptarse a los cambios estructurales de la sociedad motivados por factores o fenómenos de índole económico, energético o natural, para resolver los problemas derivados y aportar soluciones tecnológicas con un elevado compromiso de sostenibilidad.

CE7 - Dirigir y organizar empresas, así como sistemas de producción y servicios, aplicando conocimientos y capacidades de organización industrial, estrategia comercial, planificación y logística, legislación mercantil y laboral, contabilidad financiera y de costes.

4.2. Learning outcomes

RA153 - Conocer como integrar procesos industriales en el contexto de la economía circular

RA118 - Conocer las opciones metodológicas para la integración de aspectos ambientales, económicos y sociales en el análisis de sostenibilidad

* The Learning Guides should reflect the Skills and Learning Outcomes in the same way as indicated in the Degree Verification Memory. For this reason, they have not been translated into English and appear in Spanish.

5. Brief description of the subject and syllabus

5.1. Brief description of the subject

Section 3.2 Recommended prior knowledge to take this course

This course has been designed under the assumption that students have some prior knowledge on Operations Management.

Recommended previous knowledge include:

- demand forecasting,
- inventory management models,
- production planning and scheduling ; MRP,
- JIT manufacturing, lean management,
- linear programming models: formulation, solving and sensitivity analysis,
- MILP: formulation, solving and understanding the results.

This **Supply Chain Management course** addresses the following **objectives**:

- To understand the concept of supply chain networks/ecosystems, and the means and activities within its scope.
- To identify the main factors involved in supply chain networks/ecosystems design and the approaches and methods used for this purpose.
- To recognize the main supply chain management activities and basic techniques to perform them, with a special emphasis on the management of circular supply chain networks/ecosystems.
- To understand the role of supply chain networks/ecosystems in providing products and services that satisfy human needs, and their positive/negative impacts from a social and environmental standpoint.

The course, as indicated in section 3. Prior Knowledge, has been designed under the assumption that students have already some basic knowledge on Operations Management ("Gestión de la Producción", 1st course MSc Chemical Engineering, or equivalent course). Recommended knowledge to review before course sessions include: demand forecasting inventory management models, production planning and scheduling; MRP; JIT manufacturing and lean; linear programming models: formulation, solving and sensitivity analysis; MILP: formulation, solving and understanding the results.

5.2. Syllabus

1. The concept: supply chains / supply chain networks / supply chain ecosystems
2. The Forrester effect. Competition, cooperation and collaboration in supply chain networks/ecosystems
3. Supply Chain Strategy: efficiency, responsiveness, resilience, agilism
4. Integrated product and supply chain design
5. Global supply chains: risk management, sustainability and ESG factors, governance
6. Closed-loop supply chains: regenerative and restorative economy/engineering
7. Distribution and transportation networks design

6. Schedule

6.1. Subject schedule*

Week	Type 1 activities	Type 2 activities	Distant / On-line	Assessment activities
1	Course presentation. Topic 1. Duration: 02:00 Lecture			
2	Topic 1 Duration: 02:00 Lecture			
3	Forrester effect. Simulator. Duration: 02:00 Gamification			
4	Forrester effect. Case discussion Duration: 02:00 Cooperative activities			
5	Topic 3. Supply Chain Strategy Duration: 01:00 Lecture Topic 3. Case discussion Duration: 01:00 Cooperative activities			
6	Topic 4. Product and SCN design. Case discussion. Duration: 02:00 Cooperative activities			
7	Topic 5. Global supply chain networks/ecosystems Duration: 02:00 Lecture			
8	Topic 5. Global supply chain networks/ecosystems. Case discussion Duration: 02:00 Cooperative activities			
9	Topic 6. Circular supply chains Duration: 02:00 Lecture			
10	Topic 6. Circular supply chains. Practical Activity Duration: 02:00 Design thinking			
11	Topic 6. Circular supply chains (2) Duration: 02:00 Lecture			

12	Topic 6. Circular supply chains (3) Duration: 02:00 Lecture			
13	Topic 6. Research-based learning. Team work presentation Duration: 02:00 Additional activities			
14	Topic 7. Network design Duration: 02:00 Lecture			
15				Progressive Evaluation Exam (PEE) Written test Progressive assessment Presential Duration: 02:00 Practical Work (PW) delivery Individual work Progressive assessment Not Presential Duration: 00:00 Global exam. Ordinary call (January) Written test Global examination Presential Duration: 02:00
16				
17				

Depending on the programme study plan, total values will be calculated according to the ECTS credit unit as 26/27 hours of student face-to-face contact and independent study time.

7. Activities and assessment criteria

7.1. Assessment activities

7.1.1. Assessment

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
15	Progressive Evaluation Exam (PEE)	Written test	Face-to-face	02:00	50%	3 / 10	CE7 CE10 CB8
15	Practical Work (PW) delivery	Individual work	No Presential	00:00	50%	3 / 10	CB8 CE7 CE10

7.1.2. Global examination

Week	Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
15	Global exam. Ordinary call (January)	Written test	Face-to-face	02:00	100%	5 / 10	CB8 CE7 CE10

7.1.3. Referred (re-sit) examination

Description	Modality	Type	Duration	Weight	Minimum grade	Evaluated skills
Re-sit exam. Extraordinary call (July)	Written test	Face-to-face	02:00	100%	5 / 10	CB8 CE7 CE10

7.2. Assessment criteria

In the **ordinary call**, the progressive evaluation program is the by-default assessment method. In case of not fulfilling the criteria for passing the course through progressive evaluation, students can take the global exam.

In the progressive evaluation program, the course mark considers two items:

- Progressive Evaluation Exam (PEE), 50%, minimum threshold 3/10
- Practical Work (PW), 50%, minimum threshold 3/10

The resulting course mark should be above 5 points out of 10.

Practical Work (PW): During the course, practical sessions will include a wide variety of activities, such as: teamwork defense, classroom serious games, design thinking workshops, case discussions, EELISA challenges, invited lectures, field visits, etc. The Practical Work (PW) assessment will take into account the grading obtained in the different deliveries required during the course as well as active class participation (number and significance of the contributions to class discussion).

Global exam

Students not fulfilling the criteria for passing the course via progressive evaluation can take the global evaluation exam in the ordinary call. In this assessment program, course mark is the exam mark and the minimum grade to pass the course is 5 points out of 10.

Extraordinary call (July)

The re-sit exam can include questions about the practical work carried out during the course. Course mark is the mark obtained in the exam, minimum grade 5 points out of 10.

8. Teaching resources

8.1. Teaching resources for the subject

Name	Type	Notes
Chopra y Meindl	Bibliography	Chopra, S. y Meindl, P. (2016). Supply Chain Management. Strategy, Planning and Operation. Prentice Hall; 6th edition.
Simchi-Levy, Kaminsky y Simchi-Levy	Bibliography	Simchi-Levi D, Kaminsky P, Simchi-Levi E (2008) Designing and managing the supply chain: concepts, strategies and case studies. 3rd edition. McGrawHill
Weetman	Bibliography	Weetman, Catherine (2016) A Circular Economy Handbook for Business and Supply Chains. Repair, Remake, Redesign, Rethink. London: KoganPage

9. Other information

9.1. Other information about the subject

ACADEMIC HONOR CODE

Course participants, both students and faculty members, will adhere to the [ETSI Industriales UPM honor code](#).

In this course, Supply Chain Management, violations to the honor code in the section *students' code of conduct / honest work* mean, at least, a direct 0 mark in the ordinary call. The student will not have the right to be assessed again before the resit exam in the extraordinary call.

Course instructors trust in our students? academic honesty. We encourage course participants to explore, research and cross-check a variety of sources and materials when preparing course assignments. We also encourage the

discussion of course contents with other fellow students and the use of generative Artificial Intelligence tools, such as ChatGPT, in a positive way for your own learning. However, please note the need to adequately recognize the sources used (avoid plagiarism, presenting as you own texts written by other authors or AI-generated content, without providing the proper references or credit), as well as to individually and personally prepare the course assignments as required.

COURSE CONTRIBUTIONS TO THE SDGs

This course is directly linked to the following goals and targets of the 2030 [UN Agenda for the Sustainable Development Goals](#):

- [SDG 12: Responsible Consumption and Production](#). This course specifically deals with targets from 12.2 to 12.6 (both inclusive).
- [SDG 17: Partnerships for the Goals](#). Supply chain networks are an early example of partnership organizational structures, in this case among private-private partners who articulate a win-win cooperation relationship that benefits both partners. However, those structures, which emerged in the 80-90s, have evolved and widened its scope in the last two decades, to involve cooperative relationships not only among private sector agents, but also with actors from the public sector and the third sector. Likewise, the dyadic supplier-buyer relationships of the 80s-90s supply chains have also expanded their breath to incorporate a variety of participants in multi-stakeholder partnerships. The course provides the frameworks to understand the need of those partnership organizational structures to deal with nowadays? complex and uncertain business scenarios.

In addition to those two main goals, the course content and its learning methodology also contribute to the following goals and targets: 4.7 (education for sustainability), 5.5. (female leadership in supply chains engineering), 7.3 (transport efficiency, design of efficient supply chains), 11.5, (closed-loop supply chains, solid waste management systems), 3.d & 11.6 & 11.b (risk management in supply chains), as well as the three SDGs most focused on the environment (SDGs #13 Climate Action, #14 Life Below Water, and #15 Life on Land).

PLATFORMS

If synchronous online face-to-face sessions are needed, they will take place in Zoom, in sessions previously created in the Moodle site of the course.

Office hours can also take place via MS Teams.