# UAB
## Universitat Autònoma de Barcelona

**Supply Chain Network and Flow Management**

Code: 44763
ECTS Credits: 9

**2025/2026**

| Degree | Type | Year |
|---|---|---|
| Logistics and Supply Chain Management | OB | 1 |

## Contact

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## Teachers

(External) Jeļena Pečerska (main contact: jelena.pecerska@rtu.lv)

(External) Līga Millere-Krūma

## Teaching groups languages

You can view this information at the end of this
document.

## Prerequisites

The student should have successfuly completed the following courses:

- 44756 Decision Making
- 44760 Basics of Logistics and Supply Chain Management

## Objectives and Contextualisation

This module aims to provide the following skills:

- Ability to address LSCM problems in a holistic approach by taking into account general SC
  management concepts:
      Address problems of supply chain networks and supply chain network management using the
      appropriate terminology and the relevant techniques; obtain the knowledge of state-of-the-art in
      techniques and practices in SCM
      Demonstrate the critical thinking by analysing situations and selecting techniques to solve SCN
      problems.
      Demonstrate an understanding of and appreciation for the importance of the network-oriented
      approach to SCM; identify the network-related issues in SCM
      Identify the key risk factors to be considered when analysing a SC network
      Chose applicable inventory management strategy and to apply the strategy on warehouse and
      network level

Identify trade-off issues of transportation, inventory and warehouse management and recommend strategies and actions to implement the strategies

- Demonstrate abilities to
  select and apply the appropriate technology for obtaining solutions for a variety of supply chain network management problems and evaluate their complexity
  distinguish supply chain modelling approaches and apply them to particular task solving on operational, tactical and strategic levels, evaluate alternative approaches
  understand the key drivers of supply chain performance and their inter-relationships with strategy
  work effectively in a team, including agreeing on task distribution and work on collaborative goals, apply time-management and present the results of team work
- Demonstrate abilities in oral and written communication both in the student's native language and in English. Demonstrate synthesis skills and ability in presentation techniques.
- Demonstrate information management skills: ability to retrieve and analyse information from different sources.
- Ability to analyse and face a new problem under a scientific perspective.
- Select and apply the most relevant analytical methodologies, strategies and current technologies to elaborate solid arguments based on quantitative models and analytical methods to convince and motivate decision makers, determine the adequate partners and then plan and coordinate the implementation of the solution.
- Intermediate MS Excel user functionality, familiarity with Pivot Tables.

This module has two course units. Supply Chain Network Management Technologies (Ass.Prof. Jeļena Pečerska) and Global Markets and Supply Chain (Lect. Rinalds Pļavnieks).

CU1: Supply Chain Network Management Technologies (6 ECTS)

The course *Supply Chain Network Management Technologies* focuses on essential technologies for effective supply chain networks management.

Supply chain networks (SCN) cover not only supply chain management (SCM) but also the management of SC participants' relationship. In frame of these activities, actions and interests of the participants must be harmonized. SCN should be analysed from participants, participants' relationship, and the whole network point of view.

The main objective of this training course is to form the vision of SCN management, based on comprehensive systems analysis and multilevel cooperation as a requirement for problem understanding and solution in SCN. In order to achieve the main goal, it is proposed to solve the problems of managing SC activities with the use of quantitative models for a single object, the system of objects and the small network of logistics objects.

Some aspects of risk management in SCs and SCNs are considered. The acquired knowledge forms the basis of decision-making in the management of web-based virtual enterprise both on the tactical and strategic levels. The supplychain operations reference (SCOR) model is concept is introduced for understanding of the relationship between SC processes and performance metrics. The obtained skills are applied in the analysis of the SCOR model metrics of the virtual enterprise.

The set of sub-objectives of this subject are:

- Introduction of a systemic approach to SCN analysis, based on multilevel cooperation Introduction of risk concept for SC
- Recognition of the need to adapt SCM techniques for use in the SCN
- Recognition of the importance of quantitative and qualitative modelling approaches for SCN management
- Customization of the SCOR model for the particular needs of a company, based on its supply chain strategy

After the course, students are expected to be able:

- to consider, interpret and use professional terminology in logistics and supply chain management area;
  to select and apply the appropriate technology for obtaining solutions for a variety of supply chain network management and design problems;

- to distinguish supply chain modelling approaches and apply them to particular task solving in operational, tactical and strategic levels;
- to understanding key drivers of supply chain performance and their inter-relationships with strategy and other functions.

CU2: Global Markets and Supply Chain (3 ECTS)

The course *Global Markets and Supply Chain*(GMSC) is thought in the context of global economy and markets, with their drivers and needs for supply chain. In GMSC course current patterns of supply chain and transport interaction with global economy are studied.

The set of objectives of this subject are:

- To study tendencies in Supply Chain management methods (theoretical and practical) and key elements required from logistics to support modern entrepreneurship and supply.
- To study correlation between transport (all modes) corridors and economical (raw materials, production and consumption) markets.
- To analyse current transport market structure (air, rail, sea and road) on infrastructure, administrative, freight forwarding and carrier level.
- To analyse main industries (production and service), to understand their key logistic needs and Supply Chain management processes (strategic and operational) required to ensure their efficiency and functionality.
- To provide application differences of the Supply Network and Value Chain concepts, in different levels of Supply Chain.
- Carry out simulation covering main Supply Chain Management strategic tasks: to learn capabilities to analyse process in overall context (company/global logistic market level), analyse element impact on other segments (strategic and operational level), train to perform any of given task individually and successfully.

After the course, students are expected to be able:

- to define and use professional terminology of supply chain management.
- to choose the optimal solution for supply chain processes planning, using special methods.
- to define company's role into supply chain; characterize differences between supply chain and logistic channel.
- to create model of informational, financial and cargo flow for global market; assume supply chain flows; work out optimization project, systematize modelling results and theoretical information, working in groups and presenting results of works in groups.
- to evaluate customers' orders as well as to model order fulfilment process.

## Learning Outcomes

1. CA13 (Competence) Develop arguments based on quantitative models and techniques by distinguishing between the different styles of supply network modelling and incorporating the conditioning factors stemming from the economy and market, and use them to solve specific operational, tactical and strategic tasks by evaluating alternative approaches.
2. CA14 (Competence) Integrate the most relevant analytical methodologies, strategies and technologies to identify appropriate supply network partners and to plan and coordinate the implementation of the solution.
3. KA18 (Knowledge) Recognise specific supply network terminology.
4. KA19 (Knowledge) Identify supply network management strategies whilst taking the economy and markets into account.
5. KA20 (Knowledge) Identify supply network performance metrics.
6. SA20 (Skill) Determine the design elements for supply networks and use appropriate supply network modelling notation.

7. SA21 (Skill) Select and apply the appropriate technology in order to find solutions to supply network design and management problems, whilst bearing in mind the economic and market-related limitations.
8. SA22 (Skill) Select and apply suitable methods and technology in order to find solutions to a range of supply network management challenges, evaluate their complexity and demonstrate critical thinking by analysing situations and selecting the most promising solution.

## Content

CU1: <u>Supply Chain Network Management Technologies</u> (6 ECTS) The main topics of the course are:

*Theory*

- Replenishment concepts and logistics activities, the network-based worldview. Technologies for effective supply chain networks management.
- Supply Chain Risk concept
- Modelling of logistics systems and supply chains. Tasks and methods Quantitative/qualitative models for decision support in supply chains networks.
- Strategic, tactical and operational management
- Performance measurement methods and tools Supply chain networks' concepts and best practices.

*SCNMT Problems*

Exercises

- Application of replenishment concepts:
  for a single warehouse,
  for independent warehouses in a multi echelon network, adaptation for related warehouses in a multi echelon network.
- Description and evaluation of the SCOR model process metrics of a virtual enterprise.

*Practice*

- SC management of a virtual enterprise
  Reliability: customers' service level, safety stocks, managing warehouse space, negotiating reliable deliveries, Strategy into action exercises.
  Batches and frequencies: shelf life, lot sizing, supply chain mapping. Strategy into action exercises.
  Speed and quality: payment terms, transport mode selection, Strategy into action exercises.

CU2: <u>Global Markets and Supply Chain</u> (3 ECTS)

The main topics of the course are:

*Theory*

- Innovation in SCM and global economy transformation, Transport market, its structure and processes,
- SCM concepts, models and strategies,
- SCM application in different industries,
- SCM strategic level tasks and functional application,
- SCM operational level tasks and application,
- Correlation and cooperation management methods between SC elements (OEM, Tier suppliers, 4PL's, 3PL's, 2PL's and derivative organizations).

*Practical sessions*

Throughout the course a homogenous simulation is carried, where students are split in 2 groups, part are "customer" - final equipment producer, rest are its "suppliers", each with pre-defined roles and certain capabilities. Each part is followed by "customer" and "supplier" presentations and analysis in class

Parts:

1. Analysis of annual inventory
2. Supplier qualitative and commercial review
3. Placement and Transport strategy creation
4. Transport supplier selection

## Activities and Methodology

| Title | Hours | ECTS | Learning Outcomes |
|---|---|---|---|
| Type: Directed | | | |
| CU1. Practise sessions | 28 | 1.12 | |
| CU1. Theory lectures | 28 | 1.12 | |
| CU2. Case studies, individual assignments. | 30 | 1.2 | |
| CU2. Theory lectures | 16 | 0.64 | |
| Type: Supervised | | | |
| CU1. Practise exercises | 32 | 1.28 | |
| CU1. Problem sessions | 8 | 0.32 | |
| CU2. Practise exercises | 10 | 0.4 | |
| Type: Autonomous | | | |
| CU1. Mastering in the lectured course material | 54 | 2.16 | |
| CU2. Mastering in the lectured course material | 15 | 0.6 | |

CU1: Supply Chain Network Management Technologies (6 ECTS)

The course is organized by combining the following activities:

- Lectures and guest lectures by Industry logistics management professionals and experts
- Problem sessions: computer labs and individual reports
- Practise sessions: virtual enterprise SC management, teamwork and team presentations. Industrial visits, when possible.
- Autonomous work

Simulation tools are used for promoting students hand on skills

CU2: Global Markets and Supply Chain (3 ECTS)

The course is organized by means of traditional lectures combined with seminars and practical work. The learning process will combine the following activities:

- Power Point and Video material lectures

- Supervised practical task sessions: computer labs with individual reports and common analysis/overview
- Autonomous practical task sessions: virtual and direct communication between students to support their "customer" and "supplier" tasks.

Use of Generative Artificial Intelligence Tools - Policy Statement

This module acknowledges the increasing role of generative artificial intelligence (AI) as a support tool in academic work. Accordingly, the use of such tools is permitted on a limited basis, strictly for enhancing the formal aspects of student submissions. Acceptable uses include improving writing quality, style, clarity of exposition, linguistic accuracy, and translation, as well as obtaining occasional technical assistance.

However, the use of generative AI to create the substantive content of assessed work is strictly prohibited. This includes, but is not limited to: the development of methodological approaches, the design or execution of experiments, the analysis or interpretation of results, the formulation of ideas, and the drafting of conclusions. These tasks must be carried out entirely by the student, as they constitute the essential intellectual and creative contributions required to successfully complete the subject.

Students are required to explicitly declare the use of any generative AI tools in each submitted piece of work. This declaration must include:

- The specific tools used
- The purpose for which they were used
- The extent of their contribution

Excessive, irresponsible, or unnecessary use of such tools may negatively affect the final grade. Any undeclared or inappropriate use of generative AI may result in failure of the subject.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Assessment

## Continous Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|---|---|---|---|---|
| CU1. Final exam | 40% | 2 | 0.08 | CA13, KA18, KA19, KA20 |
| CU1. Practise exercises | 40% | 0 | 0 | KA19, KA20, SA20, SA22 |
| CU1. Problems | 20% | 0 | 0 | CA13, CA14, KA19, KA20, SA20, SA22 |
| CU2. Laboratory works | 20% | 0 | 0 | CA14, KA20, SA20, SA21 |
| CU2. Simulation results and report | 40% | 0 | 0 | CA13, CA14, KA18, KA19, SA21 |
| CU2. Theoretical exam | 40% | 2 | 0.08 | CA14, KA18, KA19, KA20 |

CU1: Supply Chain Network Management Technologies (6 ECTS)

The final grade is calculated from the assessment of different evaluation activities:

- Application of replenishment concepts. Simulation results and reports. Description and evaluation of the SCOR model process metrics of a virtual enterprise. Report.

- Management results of a virtual enterprise and oral presentation.Team report,
- Written theoretical exam at session time.

The mark of each activity should be above 4 points (out of 10). All the reports must be submitted within the due dates specified by the professor. The failed activities should be re-submitted after corrections until the end of the semester.

If the oral presentation is failed, the total grade for practice sessions is decremented, but not under 4 points (out of 10).

CU2: Global Markets and Supply Chain (3 ECTS)

The final grade is calculated from the assessment of different evaluation activities:

- Two intermediate laboratory works
- Simulation report quality and used methods
- Simulation results or commercial results of simulation enterprise.
- Written theoretical exam at session time.

CU1 and CU2

All activities are mandatory (based on RTU rules and Republic of Latvia immigration rules, the participation in all the classes for foreign students is mandatory).

The module final mark will be averaged from both course unit qualifications according to the credit number of each course unit. In order to average all the evaluation activities, the mark of each of them must be above 4 points (out of 10). All the report-based activities must be submitted within the due dates specified by the professor. If a report-based activity is failed, the student will be asked to re-submit its report according tothe corrections/indications provided by the professor.

The written theoretical exam is scheduled at session time. If the written theoretical exam is failed, one additional exam is organized at session time, one additional exam is organized at after-session time. If all three attempts failed then the study course should be retaken (based on RTU general rules).

The weights of each evaluation activity are given in the table below.

## Bibliography

CU1: Supply Chain Network Management Technologies

1. D. Blanchard, Supply Chain Management. Best Practices. 2nd edition, Wiley, 2013.
2. S. Chopra and P. Meindl, Supply Chain Management. Strategy, Planning, And Operation. 5th Edition, Pearson, 2013.
3. M. Michael Watson, S. Lewis, P. Cacioppi un J. Jayaraman, Supply Chain Network Design: Applying Optimization and Analytics to the Global Supply Chain (FT Press Operations Management), Pearson, 2012.
4. Tapiero and K. Kogan, Supply Chain Games: Operations Management and Risk Valuation. Series: International Series in Operations Research & Management Science, vol. Vol. 113, Springer, 2007.
5. Weenk E. Mastering the Supply Chain. Principles, Practice, and Real-Life Applications, KoganPage, 2020.

CU2: Global Markets and Supply Chain (3 ECTS)

1. Bowersox D, Closs D,Cooper M. Supply chain and logistics Management, 3rd edition, McGraw Hill Higher Education, 2009.
2. Cohen.S Strategic Supply Chain Management. McGraw-Hill; 2nd edition 2008.
3. Michael H. Hugos. Essentials of Supply Chain Management, 2nd Edition Wiley, 2006
4. Laporte G., Semet F. Logistics and Supply chain managements, Montreal, Canada. 2008.

5.  Pooler, V.H. and D. Pooler, Purchasing and Supply Management: Creating the Vision, Chapman & Hall, 2003.

## Software

Supply Chain game software The Fresh Connection https://inchainge.com/business-games/tfc/

## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.