The subject provides the student the basic information to understand the structure and operation of a supply chain as a whole, as well as each of its structural nodes (production systems, warehouses, and transport systems).

Appropriate methodologies and tools for decision making will be provided at the different levels of supply chain design. As a result, the student will learn to identify the main variables that influence the performance of any process in the supply chain, in order to make the more convenient design, according to the objectives of the company involved.

Specifically, decisions related to the definition of supply chain strategy, selection of production, warehouses and transportation systems, selection of locations, as well as the allocation of roles and capacity of each structural element of the supply chain.

1. Key Information

Module Code: 13621
Module Title: Supply chain design
Credit Points: 6
Module Status: Compulsory
Course Title: BSc in Engineering and Management
Module Block: Business Technologies
Module Theme: Logistics and manufacturing

2. Lecturer: Francisco Espinosa Canales
Tutorial Hours: Friday, 4:30 p.m. to 6:30 p.m.

3. Required Reading:
- Global Supply chain and Operations Management. Springer Dmitry Ivanov, Alexander Tsiptoulanidis & Jörn Schönberger
- Supply chain logistics management. Mc Graw Hill. Donald J. Bowersox, David J. Closs, M. Bixby Cooper

4. General overview of the module

Supply chain as a whole, as well as each of its structural nodes (production systems, warehouses, and transport systems).

Appropriate methodologies and tools for decision making will be provided at the different levels of supply chain design. As a result, the student will learn to identify the main variables that influence the performance of any process in the supply chain, in order to make the more convenient design, according to the objectives of the company involved.

Specifically, decisions related to the definition of supply chain strategy, selection of production, warehouses and transportation systems, selection of locations, as well as the allocation of roles and capacity of each structural element of the supply chain.

5. Recommended prior knowledge

<table>
<thead>
<tr>
<th>Code</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

6. Module objectives – Learning outcomes

Basic and general competencies
- CB2 – To apply theoretical knowledge to professional practice, making decisions based on rational argument.
- CB4 – To transmit information, ideas, problems, and solutions to both a specialized and non-specialized audience.
- CB5 – To undertake future studies in an autonomous way.
- 01 - To be able to work in group, in multilingual and multicultural environments.
- 02 – To use the technological and economical techniques, abilities, and tools used in the professional practice related to the engineering and Management.
- 04 – To learn how to analyze elements that are crucial in the business decision-making.
- 05 – To communicate in formal languages, using graphics and symbols.
- 06 - Ability to make decisions in an environment of business certainty and uncertainty.

Specific competencies
- 03 – To plan the implementation of business strategies.
- 07 – To acquire the necessary knowledge of the supply, production, distribution, and logistics systems of the company.
- 09 – To define the potential of companies to meet the customer’s needs.
7. Teaching and learning units

1. Introduction to supply chain & operations management.
   1.1.-Understanding the supply chain.
   1.2.-The objectives of a supply chain.
   1.3.-Structure and function of the supply chain.
   1.4.-Supply chain and the business strategy.

2. Types of supply chains
   2.1.-Attributes of Supply chain.
   2.2.-SCM in vertical and horizontal business integration environments.
   2.3.-Case study (group).

3. Designing operations and supply network: Strategic perspective.
   3.1.-Supply chain and the global business environment.
   3.2.-Competitive and Supply Chain Strategies.
   3.3.-Achieving strategic fit.
   3.4.-Expanding Strategic Scope.

4. Design of structural elements of supply chain
   4.1.-Productive systems & Layout
   4.2.-Warehouse (handling and storage).
   4.3.-Inventory management
   4.4.-Transportation.
   4.5.-Management information system
   4.6.-Supply chain performance (drivers and metrics).
   4.7.-Case study (individual).

5. Network design in the supply chain
   5.1.-The role of network design in the supply chain.
   5.2.-Factors influencing network design decisions.
   5.3.-Framework for network design decisions.
   5.4.-Location of facilities and capacity.

6. Global supply chain networks
   6.1.-Globalization and supply chain
   6.2.-Risk management in global supply operations.
   6.3.-Case study (group).

8. Teaching and learning methods

<table>
<thead>
<tr>
<th>Unit</th>
<th>Theory (Classroom)</th>
<th>Practical (Classroom)</th>
<th>Practical (Laboratory)</th>
<th>Practical (Fieldwork)</th>
<th>Practical (ICT)</th>
<th>Self-guided study</th>
<th>TOTAL HOURS</th>
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<td>TOTAL HOURS</td>
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<td>105</td>
</tr>
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</table>

9. Assessment

Students enrolling for the first time:

<table>
<thead>
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<th>Type</th>
<th>Description</th>
<th>Acts No</th>
<th>Weight (%)</th>
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</thead>
<tbody>
<tr>
<td>Continuous assessment:</td>
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<tr>
<td>Academic Assignment</td>
<td>It involves individual work that will require analysis and resolution of a situation that has multiple solutions, through reflection and dialogue for integrated and meaningful learning. It will be scored on the content delivered and presented.</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Academic Assignments</td>
<td>It involves group work that will require analysis and resolution of a situation that has multiple solutions, through reflection and dialogue for integrated and meaningful learning. It will be scored on the content delivered and presented.</td>
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Synthesis tests:

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<tr>
<td>Open response test</td>
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<tr>
<td>Final test</td>
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<tr>
<td>Multiple choice test</td>
<td>10</td>
</tr>
<tr>
<td>Open response test</td>
<td>30</td>
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</tbody>
</table>

All students must comply with the rules of writing, spelling and grammar in the development of their work and their assessment tests.

Attendance is compulsory to ensure that you extract the most value from the module and meet the learning requirements. Therefore, session absence accounting for more than 15% of the prescribed hours will result in the inability to be awarded a mark for continuous assessment. Consequently, the maximum mark that can be achieved will be that obtained solely from Synthesis tests.

Continuous assessment is attendance based and non-recoverable. Therefore, the mark obtained for this part of the assessment will serve for both the first and second call. The synthesis test could be repeated at the end of the semester.

In order to pass the module a mark equal to or greater than 5 must be obtained in the final synthesis test and the weighted mark of the synthesis tests must be equal to or greater than 5. If this is met, the final mark will be calculated by weighting the synthesis tests with the continuous assessment, having to achieve a final grade equal to or greater than 5 to pass the module. If it is not met, the final grade after weighting will be a maximum of 4,5.

Students enrolling for the second time:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Acts No</th>
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<tr>
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<tr>
<td>Academic Assignment</td>
<td>It involves individual work that will require analysis and resolution of a situation that has multiple solutions, through reflection and dialogue for integrated and meaningful learning. It will be scored on the content delivered and presented.</td>
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<tr>
<td>Synthesis tests:</td>
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<tr>
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</tbody>
</table>

All students must comply with the rules of writing, spelling and grammar in the development of their work and their assessment tests.

It is not obligatory to attend sessions. However, it is recommended so that the student can extract the most value from the module and effectively meet the learning requirements.

Continuous assessment is non-recoverable. Therefore, the mark obtained for this part of the assessment will serve for both the first and second call. The synthesis test could be repeated at the end of the semester.

In order to pass the module a mark equal to or greater than 5 must be obtained in the final synthesis test and the weighted mark of the synthesis tests must be equal to or greater than 5. If this is met, the final mark will be calculated by weighting the synthesis tests with the continuous assessment, having to achieve a final grade equal to or greater than 5 to pass the module. If it is not met, the final grade after weighting will be a maximum of 4,5.