240ST1131 - Operations Management in the Supply Chain

Degree competences to which the subject contributes

Specific:
CESCTM1. Designing supply chains, or parts thereof, by applying the methods, techniques and tools that are appropriate for each specific function and purpose.
CESCTM4. Know and apply the modeling techniques and simulation optimization to solve the problems of design, operation and management of transportation systems.

Learning objectives of the subject

The main objective is to introduce a set of decisions related to the management of manufacturing and logistics systems and supply chain, focussed on the operations management, and provide a basic conceptual view and some elementary management tools.

At the end of the course, the student is expected to be able to:

* Identify the types of problems in management of the manufacturing and logistics systems and developing the appropriate procedures of resolution to provide feasible and reasonable solutions.
* Identify which decisions to take in the short-term and medium-term in the behaviour of industrial engineering (Operations Management) and the most common criteria.
* Use the appropriate quantitative techniques to support the decision making.
* Develop the ability of reasoning in real situations of management.
* Manage several kinds of manufacturing and logistics systems (goods or services, product-focused or process-focused ...).
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 250h</th>
<th>Hours large group:</th>
<th>0h</th>
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<tbody>
<tr>
<td>Hours medium group:</td>
<td>60h</td>
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<td>24.00%</td>
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<tr>
<td>Hours small group:</td>
<td>30h</td>
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<td>12.00%</td>
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<tr>
<td>Guided activities:</td>
<td>0h</td>
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<td>0.00%</td>
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<tr>
<td>Self study:</td>
<td>160h</td>
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<td>64.00%</td>
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</tbody>
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### 1. Introduction

**Learning time:** 32h  
Practical classes: 4h  
Laboratory classes: 2h  
Self study: 26h

**Description:**  

**Related activities:**  
Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercise.

**Specific objectives:**  
Identify the managerial characteristics for different organizations and in particular for manufacturing and logistics systems.

Determine the best investment options from one or more criteria.

### 2. Purchasing

**Learning time:** 30h  
Theory classes: 12h  
Practical classes: 4h  
Self study: 14h

**Description:**  

**Related activities:**  
Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercise.

**Specific objectives:**  
Determine the best purchasing policy for a certain business.
### 3. Inventory management

**Learning time:** 52h  
- Practical classes: 12h  
- Laboratory classes: 6h  
- Self study: 34h

**Description:**  
Definition of inventory, classification and costs. Inventory management. Deterministic models: EOQ formula; simultaneous supply and usage; quantity discounts; case of managing jointly several items; non-homogeneous demand. Introduction to the variable demand.

**Related activities:**  
- Theoretical lecture.  
- A short-duration activity in theory class to reinforce the concepts and its application.  
- Exercises.

**Specific objectives:**  
- Identify the different types of costs and elements to be considered in inventory management.  
- Solve a situation of inventory management in a deterministic context, using the appropriate model.

### 4. Operations planning

**Learning time:** 46h  
- Practical classes: 8h  
- Laboratory classes: 4h  
- Self study: 34h

**Description:**  

**Related activities:**  
- Theoretical lecture.  
- A short-duration activity in theory class to reinforce the concepts.  
- Exercises.

**Specific objectives:**  
- Identify the elements to be considered in planning (demand, capacity and costs).  
- Develop a Master Production Schedule intuitively or optimally.
## 5. Requirements planning

**Learning time:** 24h  
- Theory classes: 8h  
- Laboratory classes: 4h  
- Self study: 12h

**Description:**  

**Related activities:**  
Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercise.

**Specific objectives:**  
Understand the BOM of a product.  
Determine the supply and manufacturing orders to meet a plan.  
Determine the amount of resources required for manufacturing and distribution.

## 6. Operations scheduling

**Learning time:** 50h  
- Practical classes: 12h  
- Laboratory classes: 8h  
- Self study: 30h

**Description:**  

**Related activities:**  
Theoretical lecture.  
A short-duration activity in theory class to reinforce the concepts.  
Exercises (they refered to manufacturing and logistic operations).

**Specific objectives:**  
Determine the type of flow in a given production system.  
Determine a schedule for manufacturing operations, using the appropriate procedure.  
Design of an assembly line.
The evaluation is done by several methods:

(1) a final exam (EF) with a maximum of three hours duration, consisting of several theoretical and practical exercises in which the student must demonstrate the ability to apply learned knowledge and to develop specific procedures of resolution;
(2) a mid-term exam (PP) with a maximum of 1h15 'duration, in which the student is basically faced to intellectual agility questions and short exercises;
(3) an exam about exercises (EP) with a maximum of 1 hour duration, in which the student must demonstrate that he/she is able to solve situations slightly different from those worked out in class;
(4) evaluation during practical sessions (TP), in which the student must demonstrate his/her progressive learning during practical sessions.
(4) a business game (BG) in which the student must apply concepts in the simulation of a real case and learn the group work;
(5) works (TR), to develop solutions to complex real situations.

The final grade for the course $N_{\text{final}}$ will be obtained:

$$N_{\text{final}} = 0.6 \cdot N_{\text{af}} + 0.2 \cdot N_{\text{ep}} + 0.2 \cdot N_{\text{ac}}$$

- $N_{\text{af}}$: final exam evaluation
- $N_{\text{af}} = EF$
- $N_{\text{ep}}$: practical sessions evaluation
  - $N_{\text{ep}} = \max \{EP; 0.5 \cdot TP + 0.5 \cdot EP\}$
- $N_{\text{ac}}$: progressive learning evaluation
  - $N_{\text{ac}} = \max \{TR; 0.5 \cdot TR + 0.5 \cdot BG\}$
The final exam (EF) and the exam about exercises (PE) are open books. Electronic devices are not allowed, except pocket calculator (mobile phone or any other devices are not allowed).

The evaluation during practical sessions (TP) will be held answering the requested questions, during each session.

The business game BG and the works TR will be made following the specific rules published in the electronic campus. The solution to works TR must be send before the deadline stated in the beginning of the course.

**Bibliography**

**Basic:**


**Complementary:**


**Others resources:**

* Slides for lectures.
* Description of the exercises.