Degree competences to which the subject contributes

Specific:
1. Knowledge applied to business/company organisation.
2. Basic knowledge of industrial production systems.

Teaching methodology

The course consists of the following training activities:

* Theoretical sessions. A part of these sessions corresponds to a master class (lectures) or to solve doubts or give explanations on knowledge worked in advance. And the rest is devoted to participatory-guided classes.
* Practical sessions. They correspond to a laboratory class where the students in groups of 3 or 4 apply quantitative tools in order to understand how to apply the procedures introduced in lectures.
* This is complemented by self study on concepts and exercises; this activity is distance learning.
* Finally, we consider the evaluation activities (mid-term exam, practical exam and final exam).

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
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...).

<table>
<thead>
<tr>
<th>Study load</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong> 112h 30m</td>
<td>Hours large group:</td>
<td>30h</td>
<td>26.67%</td>
</tr>
<tr>
<td>Hours medium group:</td>
<td>15h</td>
<td>13.33%</td>
<td></td>
</tr>
<tr>
<td>Hours small group:</td>
<td>0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Self study:</td>
<td>67h 30m</td>
<td>60.00%</td>
<td></td>
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</tbody>
</table>
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## Content

### TOPIC 1. Introduction to management and industrial engineering

**Learning time:** 5h  
Theory classes: 3h  
Practical classes: 0h  
Self study: 2h

**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.  
Place each of the decisions on manufacturing and logistics systems in the general scheme of decision making.  
Describe a product according to their characteristics.

### TOPIC 2. Costs and investments

**Learning time:** 6h 30m  
Theory classes: 2h  
Practical classes: 1h  
Self study: 3h 30m

**Description:**  

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

**Specific objectives:**  
Classify the costs involved in a management decision.  
Determine the best investment options from one or more criteria.
# TOPIC 3. Project planning

<table>
<thead>
<tr>
<th>Learning time: 7h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td>Practical classes: 1h</td>
</tr>
<tr>
<td>Self study: 4h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
Theoretical lecture.
Exercise.

**Specific objectives:**
- Identify the key elements in project planning and scheduling.
- Use the appropriate procedure to handle problems with potential links between tasks.
- Prepare a budget.

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# TOPIC 4. Inventory management

<table>
<thead>
<tr>
<th>Learning time: 24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 5h</td>
</tr>
<tr>
<td>Practical classes: 4h</td>
</tr>
<tr>
<td>Self study: 15h</td>
</tr>
</tbody>
</table>

**Description:**
Definition of inventory, classification and costs. Inventory management. ABC analysis. Deterministic models: EOQ formula; simultaneous supply and usage; quantity discounts; case of several items; manufacturing several articles in a single machine; non-homogeneous 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.
- Identify the relevance of each product in a global context.
### TOPIC 5. Operations planning

<table>
<thead>
<tr>
<th><strong>Learning time:</strong></th>
<th><strong>15h</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory classes:</strong></td>
<td>4h</td>
</tr>
<tr>
<td><strong>Practical classes:</strong></td>
<td>2h</td>
</tr>
<tr>
<td><strong>Self study:</strong></td>
<td>9h</td>
</tr>
</tbody>
</table>

**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.

### TOPIC 6. Requirements planning

<table>
<thead>
<tr>
<th><strong>Learning time:</strong></th>
<th><strong>17h 30m</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory classes:</strong></td>
<td>3h</td>
</tr>
<tr>
<td><strong>Laboratory classes:</strong></td>
<td>2h</td>
</tr>
<tr>
<td><strong>Self study:</strong></td>
<td>12h 30m</td>
</tr>
</tbody>
</table>

**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.
### TOPIC 7. Operations scheduling

**Learning time:** 23h  
- Theory classes: 6h  
- Laboratory classes: 4h  
- Self study: 13h  

**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.

### TOPIC 8. Global management in the organizations

**Learning time:** 14h 30m  
- Theory classes: 5h  
- Practical classes: 1h  
- Self study: 8h 30m  

**Description:**  
Release and control: productivity and KPI. Approaches to operations management, Lean Management and Just In Time, and their management tools. ERPs and implementation. Evolution: continuous improvement and reengineering.

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

**Specific objectives:**  
Identify areas of improvement in methods of work.  
Acquire a vocabulary of concepts used in management (ERP, TQM, JIT, TOC, B2B...).
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. Evaluation during practical sessions (TP), in which the student must demonstrate his/her progressive learning during practical sessions in response to 3 or 4 short answer questions about what to be held by the end of the session;
4. 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;
5. Activities in theory lessons (AT), in theoretical sessions, to solve theoretical questions and based on and practical exercises.

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
  $$N_{\text{ac}} = \max\{PP; 0.5 \cdot AT + 0.5 \cdot PP\}$$

**Qualification system**

The final exam (EF), as well as the equivalent reevaluation exam (REA), the practice exam (EP) and the mid-term exam (PP) 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 one of the sessions. They will be answered at the end of the corresponding session. It is the responsibility of the student to have the right skills taught in theory and use them fit during the available time.

If any trap attempt is detected in the TP evaluation in the practical classes of a subgroup, the qualification will be 0 for all students in that subgroup.

To obtain this mark, the student must attend the group where he/she is enrolled. Otherwise, the mark is 0. Given $n$ practices, the note will be based on the best $n-1$ marks. The alternative to attend practices, and the mark based on the work done there, is the exam about exercises EP. In case of a strike day, if the student does not attend class, his value $n$ will not be reduced in a unit. This will be repeated for each of the strike days that affect some group of practices.

About activities in theory AT, there will be at least two and they consist in a set of questions to be answered individually. Their date will be known in advance. It is a voluntary evaluation, which is substituted by the PP exam. If attendance is higher than the capacity of the classroom in an AT of a group, students enrolled in this group will have priority.

A student can perform a Theory Activity (AT) in a group different from the one that is enrolled as long as: 1. Notice to the coordinator or to whom the group theory teaches where he/she wants to go. 2. The destination group has the activity scheduled before the enrollment group.

A student can attend the REA exam if he/she has a mark different from NP in the EF exam (January or June exams). If the student attends to the reevaluation exam (REA), this mark will replace the one obtained in the final exam (EF). In the REA exam, the student must fill out a sheet of answers to the questions proposed.
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Bibliography

Basic:


Complementary:


Others resources:

* Organització i Gestió. Transparencias.
* Organització i Gestió. Enunciados de las prácticas.