### Coordinating unit:
295 - EEBE - Barcelona East School of Engineering

### Teaching unit:
732 - OE - Department of Management

### Academic year:
2019

### Degree:
- Bachelor's Degree in Chemical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Mechanical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Industrial Electronics and Automatic Control Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Energy Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Biomedical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Materials Engineering (Syllabus 2010). (Teaching unit Compulsory)
- Bachelor's Degree in Industrial Electronics and Automatic Control Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Energy Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Biomedical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Chemical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Mechanical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Electrical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Biomedical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Chemical Engineering (Syllabus 2009). (Teaching unit Compulsory)
- Bachelor's Degree in Materials Engineering (Syllabus 2010). (Teaching unit Compulsory)
- Bachelor's Degree in Industrial Electronics and Automatic Control Engineering (Syllabus 2009). (Teaching unit Compulsory)

### ECTS credits:
6  

### Teaching languages:
- Catalan
- Spanish

## Teaching staff

### Coordinator:
BRUNO DOMÉNECH LÉGA

### Others:
- Primer quadrimestre:
  - BRUNO DOMÉNECH LÉGA - M11, M12
  - ERNESTO GARRIDO GODES - M12, M22, M32
  - XAVIER GRÉBOL NOGUERAS - T11, T12, T21
  - RUBÉN MARTÍN TORT - T12, T21, T22
  - RAFAEL PASTOR MORENO - M21, M22, M31, M32
  - GEMMA ROS ESCODA - M11, M12, M21, M22, M22, M31, M32

- Segon quadrimestre:
  - ERNESTO GARRIDO GODES - M21, M22
  - XAVIER GRÉBOL NOGUERAS - T11, T12, T21
  - MARC JUANPERA GALLELL - M12, M22
  - RUBÉN MARTÍN TORT - T12, T21, T22
  - GEMMA ROS ESCODA - M11, M12, M21, M22

### Opening hours

#### Timetable:
To be arranged by email.

### Prior skills

None.
820014 - OP - Production Organisation

Requirements

None.

Degree competences to which the subject contributes

Specific:

4. Understand the applications of business organisation.

5. Understand the basics of production and manufacturing systems.

Transversal:

2. ENTREPRENEURSHIP AND INNOVATION - Level 2. Taking initiatives that give rise to opportunities and to new products and solutions, doing so with a vision of process implementation and market understanding, and involving others in projects that have to be carried out.

Teaching methodology

The course has 4 different typologies of sessions along the semester:

- Theory: explanation of the theoretical concepts and resolution of small practical examples (20% of the time)
- Problems: resolution in group of practical exercises to deepen on the theoretical concepts (10% of the time)
- Laboratory: resolution of mathematical models using specialised software (10% of the time)
- Selflearning: guided activities as well as personal and non-in-person study (60% of the time)

Learning objectives of the subject

Show the main ideas of production, its relationship with the logistics area and other management elements of the enterprise.

Give to the students the idea of the importance of decision making when managing logistic and production systems.

Prepare the student to different techniques to schedule and control activities.

Prepare the student to solve fuzzy problems.

Teach the student quantitative techniques applicable to the solution of management problems.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 45h</th>
<th>30.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 15h</td>
<td>10.00%</td>
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<td></td>
<td>Guided activities: 0h</td>
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<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
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## Content

| **Introduction** | **Learning time:** 10h  
  Theory classes: 4h  
  Self study: 6h |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Concept of production and productive system. Typologies of productive systems. Typology of decisions in production management. Concept and classifications of costs. Criteria for the evaluation and selection of investments.</td>
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</table>
| **Location and distribution** | **Learning time:** 15h  
  Theory classes: 6h  
  Self study: 9h |
<table>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Location problems and their relationship with the system production-distribution. Multicriteria nature of location problems. Classifications. Models for costs optimisation under continuous assumptions. Models for costs optimisation of several facilities under discrete assumptions. Design of distribution routes, formulation, constraints and objectives.</td>
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</table>
| **Scheduling** | **Learning time:** 30h  
  Theory classes: 12h  
  Self study: 18h |
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Characteristics and elements of programming problems. Typologies of bounds: potential, cumulative and disjunctive. Jshop and flowshop problems.</td>
</tr>
</tbody>
</table>
| **Inventory management for independent demand** | **Learning time:** 35h  
  Theory classes: 14h  
  Self study: 21h |
|-----------------|-----------------|
| **Production Planning** | **Learning time:** 25h  
  Theory classes: 10h  
  Self study: 15h |
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Concept of operations planning. Characteristics of a plan, horizon, frequency, robustness, degree of detail. Master plan, intuitive methods, Bowman model, linear models, models based on graphs theory.</td>
</tr>
</tbody>
</table>
The final mark of the course is calculated as follows:

\[ NF = \max\{NF1; NF2\} \]

\[ NF1 = 0.5 \cdot EF + 0.2 \cdot EP + 0.2 \cdot PL + 0.1 \cdot AC \]
\[ NF2 = 0.6 \cdot EF + 0.2 \cdot EP + 0.2 \cdot PL \]

**EF** = mark of the final examen  
**EP** = mark of the mid-term exam  
**PL** = mark of the laboratory evaluation  
**AC** = mark of the activities of continuous evaluation

In case of failing, a reevaluation exam can be carried out, which allows recovering 80% of the course (the mark of the laboratory exam, EL, is excluded). In order to be allowed to do such an exam, the global mark on the recorded part must not be lower than 3.

The students will be able to access the re-assessment test that meets the requirements set by the EEBE in its Assessment and Permanence Regulations (https://eebe.upc.edu/ca/estudis/normatives-academiquest documents/eebe-normativa-avaluacio-i-permanencia-18-19-aprovat-je-2018-06-13.pdf)

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### Inventory Management for Dependent Demand

**Learning time:** 10h  
Theory classes: 4h  
Self study: 6h

**Description:**  
Structure of the product, list of materials, matrix-based and iterative procedures. MRP I. Planning of production resources.

### Mathematical Modelling

**Learning time:** 20h  
Practical classes: 10h  
Self study: 10h

**Description:**  
System modelling using mathematical programming. Establishment of variables, constraints and objective. Differences between modelling and solving. Linear Programming and Integer Linear Programming.

**Specific Objectives:**  
To provide students with tools for modelling and solving problems. To provide students with the skills to differentiate between data and variables, costs and solutions, objective functions and constraints. To provide the tools to allow a student to obtain linear equivalences to nonlinear problems.
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Bibliography

Basic:


Complementary:


