Course guide
220271 - 220271 - Quantitative Methods in Industrial Scheduling

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 732 - OE - Department of Management.
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).

Academic year: 2022  ECTS Credits: 5.0  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Pep Simo
Others: Irene Trullas

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Acquire concepts and techniques related to descriptive and statistical inference.
2. Acquire concepts and techniques relating to quantitative and experimental methods for analysis and decision making.
3. Apply quantitative and experimental methods for making decisions in situations where intangibles appear

Generical:
4. Ability to apply knowledge to solve problems in new environments or unfamiliar environments within broader contexts (or multidisciplinary) related to engineering.
5. Self-learning capacity to independent continuous training.
6. Ability to integrate knowledge and formulate judgments with the aim of making decisions based on information that, with incomplete or limited include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.

TEACHING METHODOLOGY

The course is divided into three parts:
Theory classes
Practical classes
Self-study for doing exercises and activities.

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.

The teachers provide the curriculum and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

The course Quantitative Methods in Management introduces students to the concepts, principles and fundamentals of linear programming, integer-mixed linear programming, Markov chains for analysis and decision making in different contexts.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Self study</td>
<td>80,0</td>
<td>64.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>12.00</td>
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</tbody>
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**Total learning time:** 125 h

CONTENTS

**Module 1: Linear programming and graph theory**

**Description:**
- Introduction to quantitative methods
- Fundamentals of linear programming basis
- Integer-Mixed linear programming
- The transport problem
- Graph Theory

**Full-or-part-time:** 63h
- Theory classes: 15h
- Laboratory classes: 8h
- Self study: 40h

**Module 2: Markov chains**

**Description:**
- Fundamentals of Markov chains
- Simple Markov chains
- Markov chains with remuneration
- Markov chains with remuneration and decision
- Dynamic Programming

**Full-or-part-time:** 62h
- Theory classes: 15h
- Laboratory classes: 7h
- Self study: 40h

GRADING SYSTEM

The final grade of the course depends on the following evaluation acts:
- Realization of works of continuous evaluation: 70%
- Laboratory practices: 30%

Continuous assessment work may be resumed by a final examination.
BIBLIOGRAPHY

Basic: