

## 220271 - Quantitative Methods in Industrial Scheduling

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
Teaching unit: 732 - OE - Department of Management  
Academic year: 2019  
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Optional)  
ECTS credits: 5 Teaching languages: Catalan, Spanish

### Teaching staff

Coordinator: JOSE SIMÓ GUZMAN

Others: Primer quadrimestre:  
JOSE SIMÓ GUZMAN - 11, 12  
IRENE TRULLAS CASASAYAS - 12

### 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

#### Generic:

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.

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### 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

Total learning time: 125h	Hours large group:	30h	24.00%
	Hours small group:	15h	12.00%
	Self study:	80h	64.00%

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### Content

<p>Module 1: Linear programming</p>	<p>Learning time: 63h Theory classes: 15h Laboratory classes: 8h Self study : 40h</p>
<p>Description: Introduction to quantitative methods Fundamentals of linear programming basis Duality and sensitivity analysis Integer-Mixed linear programming The transport problem.</p>	
<p>Module 2: Markov chains</p>	<p>Learning time: 62h Theory classes: 15h Laboratory classes: 7h Self study : 40h</p>
<p>Description: Fundamentals of Markov chains Simple Markov chains Markov chains with remuneration Markov chains with remuneration and decision Dynamic Programming</p>	

### Qualification system

The final grade depends on the following assessment criteria:

- Test online 1: Linear Programming, weight: 10%.
- Activity 1 and 2 in R, weight:10%.
- Project 1 in R, weight: 15%.
- Mid-semester exam 1: Linear Programming, weight: 20%.
- Test online 2: Markov chains, weight: 10%.
- Project 2 in R, weight: 15%.
- Mid-semester exam 2: Markov chains, weight: 20%.

Unsatisfactory results in each of the mid-semester exams can be redressed on the day of the final exam. This test will be available to all enrolled students. The mark achieved in application of this redressment will replace the original mark as long as it is higher.

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.



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### Bibliography

#### Basic:

Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 07/07/2017]. Available on: <<http://hdl.handle.net/2099.3/36256>>. ISBN 8483017954.

Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial II [on line]. Barcelona: Edicions UPC, 2002 [Consultation: 07/07/2017]. Available on: <<http://hdl.handle.net/2099.3/36257>>. ISBN 9788483017944.