

## Course guide

### 220552 - 220552 - Quantitative Methods in Management

**Last modified:** 19/04/2023

**Unit in charge:** Terrassa School of Industrial, Aerospace and Audiovisual Engineering  
**Teaching unit:** 732 - OE - Department of Management.

**Degree:** MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2012). (Compulsory subject).

**Academic year:** 2023    **ECTS Credits:** 5.0    **Languages:** Catalan, Spanish

#### LECTURER

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**Coordinating lecturer:** CARLES FERRER FERRER

**Others:** Primer quadrimestre:  
CARLES FERRER FERRER - 1

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**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

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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

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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

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Type	Hours	Percentage
Hours medium group	15,0	12.00
Self study	80,0	64.00
Guided activities	22,0	17.60
Hours large group	8,0	6.40

**Total learning time:** 125 h

## CONTENTS

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### Module 1: Linear programming

**Description:**

Introduction to quantitative methods  
Fundamentals of linear programming basis  
Duality and sensitivity analysis  
Integer-Mixed linear programming  
The transport problem

**Full-or-part-time:** 62h 30m

Theory classes: 4h

Practical classes: 7h 30m

Guided activities: 11h

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 30m

Theory classes: 4h

Practical classes: 7h 30m

Guided activities: 11h

Self study : 40h

## GRADING SYSTEM

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The final grade depends on the following assessment criteria:

Mid-semester exam 1, weight: 35%

Mid-semester exam 2, weight: 35%

Activities and/or Project, weight: 30%

All students unable to attend the mid-semester exams, or failing it, will have the option of repeating it with the final exam.



## BIBLIOGRAPHY

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### Basic:

- Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. Barcelona: Edicions UPC, 2005 [Consultation: 22/06/2020]. 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: 22/06/2020]. Available on: <http://hdl.handle.net/2099.3/36257>. ISBN 9788483017944.