Course guide
220271 - 220271 - Quantitative Methods in Industrial Scheduling

Last modified: 17/07/2025

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: 2025 **ECTS Credits:** 5.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Lordan Gonzalez, Oriol

Others:

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 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 syllabus 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, combinatorial problems for analysis and decision making in different contexts.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	12.00
Hours large group	30,0	24.00
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

Module 1: Linear programming

Description:
- Introduction to quantitative methods
- Fundamentals of linear programming basis
- Integer-Mixed linear programming

Related activities:
Assignment R1
Assignment M1
Project

Full-or-part-time: 62h 30m
Theory classes: 15h
Laboratory classes: 7h 30m
Self study : 40h

Module 2: Combinatorial problems and graph theory

Description:
- Foundations of combinatorial problems
- Heuristics for combinatorial problems
- Targeted screening procedures
- Graph theory

Related activities:
Assignment R2
Assignment M2
Project

Full-or-part-time: 62h 30m
Theory classes: 15h
Laboratory classes: 7h 30m
Self study : 40h

GRADING SYSTEM

The final grade depends on the following assessment criteria:

Assignment R1: 10%
Assignment M1: 25%
Assignment R2: 10%
Assignment M2: 25%
Project: 30%

Since there are no written exams, there is no retake or reassessment.

BIBLIOGRAPHY

Basic:

- Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. 2a ed. Barcelona: Edicions UPC, 2005 [Consultation: 14/01/2021]. 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: 14/01/2021]. Available on: http://hdl.handle.net/2099.3/36257. ISBN 9788483017944.
- Sallán Leyes, José María; Lordan, Oriol; Fernández Alarcón, Vicenç. Modeling and solving linear programming with R [on line]. [S.l.]: OmniaScience, 2015 [Consultation: 20/09/2022]. Available on: http://hdl.handle.net/2117/78335. ISBN 9788494422935.