Course guide
220561 - 220561 - Tools for Decision Analysis

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, English

LECTURER

Coordinating lecturer:	Carles Ferrer Ferrer
Others:	Frederic Garriga

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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

Generical:
3. Ability to apply knowledge to solve problems in new environments or unfamiliar environments within broader contexts (or multidisciplinary) related to engineering.
4. 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.
5. Self-learning capacity to independent continuous training.

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 combinatorial problems, graph theory and queue theory for analysis and decision making in different contexts.

STUDY LOAD

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

Total learning time: 125 h

CONTENTS

Module 1: Combinatorial problems

Description:
Foundations of combinatorial problems
Heuristics for combinatorial problems
Targeted screening procedures

Full-or-part-time: 71h
Theory classes: 4h
Practical classes: 7h
Guided activities: 10h
Self study : 50h

Module 2: Graph theory

Description:
Graph basics
Graph topology
Modeling using graphs
Road problems
Flow problems

Full-or-part-time: 27h
Theory classes: 2h
Practical classes: 4h
Guided activities: 6h
Self study : 15h

Module 3: Queue theory

Description:
Fundamentals of queue models
Birth and death processes
Models based on birth and death processes
Costs of a waiting line

Full-or-part-time: 27h
Theory classes: 2h
Practical classes: 4h
Guided activities: 6h
Self study : 15h

GRADING SYSTEM

The final grade depends on the following assessment criteria:

Mid-semester exam 1, weight: 35%

Mid-semester exam 2, weight: 35%

Project and activities, 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

Basic:
- Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. 2a ed. Barcelona: Edicions UPC, 2005 [Consultation: 18/09/2020]. 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: 18/09/2020]. Available on: http://hdl.handle.net/2099.3/36257. ISBN 9788483017944.