Course guide
220274 - 220274 - 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 INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).

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

LECTURER

Coordinating lecturer: Fernandez Alarcon, Vicenç
Perramon Tornil, Xavier

Others:

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 appropriate examples 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. Students will be prompted to solve exercises in and outside the classroom, to promote contact and use of the basic tools needed for solving problems and for developing the activities.

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. Teachers provide the workplan for study and monitoring of activities (through ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

The course introduces students to the concepts, principles and fundamentals of combinatorial problems and queueing theory for analysis and decision making in different contexts.

STUDY LOAD

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

Total learning time: 125 h

CONTENTS

Module 1: 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: 62h 30m
Theory classes: 15h
Laboratory classes: 7h 30m
Self study : 40h

Module 2: Combinatorial problems

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

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:
- Activities of module 1, weight: 30%
- Practices of module 1, weight: 20%
- Activities of module 2, weight: 30%
- Practices of module 2, weight: 20%

All students not achieving a satisfactory result (equal to or greater than 5) with this assessment, may take a redress examination on the same day as the final exam. The mark attained in this redress examination will replace that of the activities if it is higher than the latter.

For those students who meet the requirements and sit for the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the written individual evaluation acts (activities of modules 1 and 2) and the grades obtained during the course for lab practices 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.

BIBLIOGRAPHY

Basic:
- Sallán, José M. [et al.]. Métodos cuantitativos de organización industrial I [on line]. 2a ed. 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.