Last update: 22-07-2019

220274 - Tools for Decision Analysis

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: Fernandez Alarcon, Vicenç
Perramon Tornil, Xavier

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.

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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 combinatorial problems, graph theory and queue theory 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

Module 1: Graph theory

Learning time: 24h

Theory classes: 6h
Laboratory classes: 3h
Self study : 15h

Description:
Graph basics

Graph topology

Modeling using graphs

Road problems

Flow problems.

Module 2: Queue theory

Learning time: 25h

Theory classes: 7h
Laboratory classes: 3h
Self study : 15h

Description:
Fundamentals of queue models

Birth and death processes

Models based on birth and death processes

Costs of a waiting line

Module 3: Combinatorial problems

Learning time: 76h

Theory classes: 17h
Laboratory classes: 9h
Self study : 50h

Description:
Foundations of combinatorial problems

Heuristics for combinatorial problems

Targeted screening procedures.

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Qualification system

The final grade depends on the following assessment criteria:
Mid-semester exam, weight: 35%
Final exam, weight: 35%
Assignment 1, weight: 10%
Assignment 2, weight: 10%
Assignment 3, weight: 10%

All students not achieving a satisfactory result (equal to or greater than 5) in the mid-semester exam, or who were unable to sit for it, may take a redirection examination on the same day as the final exam. The mark attained in this redirection examination will replace that of the mid-semester exam if it is higher than the latter.

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.

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.