Decisions analysis in industrial engineering

Academic Year: (2022 / 2023) **Review date: 27-07-2022**

Department assigned to the subject: Mechanical Engineering Department

Coordinating teacher: GARCIA GUTIERREZ, ISABEL

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Required: "Diseño y simulación de sistemas productivos" (3rd year)

OBJECTIVES

- Knowledge of general techniques to support industrial engineering decision making in multi-organizational and multi-decision agent context.

- Identify situations where each technique apply.

- Understand the importance of possible deviations between the case study and the model applied.

- Being able to implement the techniques studied.

- Understand the role of the R+D+I in business competitiveness and its relationship to engineering, technological capital and entrepreneurship.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to decision analysis. Quantitative models for decision-making in industrial engineering.
2. Decision tree analysis. Expected Monetary Value.
3. Search and use of additional information.
4. Certainty Monetary Equivalent. Utility functions.
5. Application of utility functions to decision tree analysis.
6. Introduction to analytical utility functions.
7. Attitudes towards risk. Types of analytical utility functions.
8. Constant proportionality risk aversion analytical utility functions.
9. Game theory. Introduction.
10. Two-person zero-sum games.
11. Two-person non-zero-sum games.
12. Introduction to multicriteria decision making.
13. Goal Programming. Problem formulation and resolution.
14. Environmental applicacions of MCDM techniques.
15. ELECTRE method. Problem formulation and resolution.
16. Application to HHRR selection problems.
17. Research, development and innovation. Technological capital and competitiveness.

LEARNING ACTIVITIES AND METHODOLOGY

Lectures, exercises, practical sessions, cases and assignments to be carried out by the students and discussed during the sessions, readings assigned by the instructor or identified by the students.

ASSESSMENT SYSTEM

60% Final written exam.
40 % Continuous evaluation. Partial exams will be held, approximately in the tentative weeks indicated in the schedule. Optionally, complementary evaluation system. May apply sampling based grading.
Minimimum grade required in the final exam: 4

% end-of-term-examination:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

BASIC BIBLIOGRAPHY

- DIXIT, AVINASH K., NALEBUFF, BARRY J. Pensar estratégicamente: un arma decisiva en los negocios, la política y la vida diaria, Antoni Bosch, D.L., 1992
- Garriga Garzón, F. Problemas resueltos de teoría de la decisión (ver adaptac para este curso), OmniaScience, 2013
- HILLIER, FREDERICK S.; LIEBERMAN, GERALD J. Introducción a la Investigación de Operaciones. Novena Edición., McGraw-Hill, 2010
- ROMERO, CARLOS. Teoría de la decisión multicriterio, conceptos, técnicas y aplicaciones., Alianza, D.L., 1993
- TAHA, HAMDY A. Investigación de operaciones. Novena edición. , Pearson, 2012
- Theory presentation and problems distributed through Aula Global, Área de Ingeniería de Organización.