Optimization and simulation in business

Academic Year: (2022 / 2023) **Review date: 12-05-2022**

Department assigned to the subject: Statistics Department

Coordinating teacher: GUERRERO LOZANO, VANESA

Type: Electives ECTS Credits : 6.0

Year : Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Mathematics
Statistics

OBJECTIVES

1. Knowing how to model and implement optimization methods and simulation techniques in decision-making problems in business.

2. Knowing the conditions to be satisfied by solutions of optimization problems.

3. Learn to use tools of modern optimization and simulation techniques in an efficient way.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction
Process modeling in decision-making problems

2. Optimization of linear models
2.1 Optimality
2.2 Examples: financial planning, etc..

3. Optimization of discrete models
3.1 Optimality
3.2 Examples: project management, electricity markets, etc.

4. Otimization of non-linear models
4.1 Optimality conditions
4.2 Least-squares methods
4.3 Newton's Method
4.4 Examples: estimation of "betas" of stocks, portfolio management, etc.

5. Simulation
5.1 Examples: stock prices, overbooking, etc.

LEARNING ACTIVITIES AND METHODOLOGY

Theory (3 ECTS), Practice (3 ECTS).
14 lectures with supporting materials available on the Web. Another 14 practical sessions (exercises and computer labs).

ASSESSMENT SYSTEM

The assessment will be made by weighting the continuous evaluation (60%) and the final exam (40%), no minimum grade in any of these two parts.

Continuous evaluation will be based on two midterms and one homework.

The students who get good grades in the continuous evaluation (more than 7 over 10 in total, with a minimum grade of 4 over 10 in each midterm and homework) do not need to take the final exam. In this case, the final assessment will coincide with that of the continuous evaluation.

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

BASIC BIBLIOGRAPHY

- 1. Winston, W.L., Albright, S. C. Practical Management Science, Duxbury Press, 2009

ADDITIONAL BIBLIOGRAPHY

- 2. Ragsdale C. T. Spreadsheet Modelling and Decision Analysis , Thomson, 2005
- 3. Lawrence, J.A., B.A. Pasternack Applied Management Science , Wiley, 2002
- 4. Russell, R.S. and Taylor, B. W. Operations Management, Prentice Hall, 2003