SYLLABUS DEL CORSO

Dinamica dei Sistemi Aziendali

2324-1-F7701M092-F7701M088M

Learning objectives

The aim of the course is to provide attending students a modern systemic approach for the analysis and modeling of some of the issue that may arise in a management context.

Concepts and methods dealt in this course are those of operations research and decision theory.

At the end of the course students will achieve a proper knowledge of some management tools that can offer an adequate decision support system. Moreover, the ability to model in quantitative terms will be relevant.

Contents

Optimization problems and their modelling.
Linear programming.
Integer linear programming.
Decision trees: Value of information and value of perfect information.

Detailed program

1. Optimization problems and models:

- Problems of production, investment, facility location, assignment, transportation, flow, project planning
- Models based on continuous, integer or binary variables, formulation of objectives and constraints using linear functions
- AMPL software

2. Linear Programming:
    * Fundamental theorem of linear programming
    * Duality and complementary slackness theorem
    * Bases: complementarity, degeneracy and optimality
    * Simplex algorithm
    * Sensitivity analysis
    * Hints of multi-objective linear programming
3. Integer Linear Programming:
    * Geometry of integer linear programming
    * Branch & Bound method
4. Decision trees:

* Basic definitions and examples
* Value of information: value of sampled information and value of perfect information

Prerequisites

Linear algebra and basic notions of probability.

Teaching methods

Frontal lessons and exercise sessions.

Assessment methods

Two in-progress written exams (exercises as a check of disciplinary problem solving skills) are conducted during the course: the first exam covers modeling optimization problems and Linear Programming; the second exam covers Integer Linear Programming and decision trees.

The final exam consists of a compulsory written exam (exercises as a check of disciplinary problem solving skills) and an optional oral exam (interview on topics covered in class).

Textbooks and Reading Materials

Reference books:

* F.S. Hillier, G.J. Lieberman, Ricerca Operativa - Fondamenti, McGraw-Hill, 2010.
* C. Vercellis, Ottimizzazione. Teoria, metodi, applicazioni, McGraw Hill, 2008.
* F. Schoen, Modelli di ottimizzazione per le decisioni, Esculapio, 2006.
* M. Pappalardo, M. Passacantando, Ricerca Operativa, Pisa University Press, 2012.

Additional materials will be provided during the course.

Semester

First semester.

Teaching language

Italian.

Sustainable Development Goals

QUALITY EDUCATION