UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Quantitative Management Science

2223-1-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. On top of this, a modeling capacity in quantitative terms will be relevant.

Contents

Optimization problems and their modelling.
Linear programming.
Integer linear programming.
Decision-making processes in stochastic systems.

Detailed program

1. Optimization problems and models:

- Types of variables: quantitative, logical, continuous, discrete
- Formulation of constraints
- Formulation of the objective function
- AMPL software

2. Linear Programming:
   * Geometry of LP and fundamental theorem
   * Duality and complementary discards
   * Bases: complementarity, degeneracy and optimality
   * Simplex algorithm
   * Sensitivity analysis
   * Graph-based modelization of projects: critical path
3. Integer Linear Programming:
   * Geometry of PLI
   * Branch & Bound method
4. Decision-making processes in stochastic systems.

Prerequisites

Linear algebra and probability.

Teaching methods

Frontal lessons and exercise sessions.

Assessment methods

Written exam.

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.
- M. Pappalardo, M. Passacantando, Ricerca Operativa, Pisa University Press, 2012.

Further studying materiale will be provided once the course starts.

Semester

First semester

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION