UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Dinamica dei Sistemi Aziendali

2122-1-F7701M092-F7701M088M

Learning objectives

The aim of the course is to introduce the modern systemic approach for the analysis and modelling of problems that can arise in a company context through the concepts and methods of operations research, a management science that can offer several supporting methods for the final decisions to be taken once the modelling process is completed. The overall objective is to develop the aptitude and the ability to analyse a problem in scientific terms.

Contents

Analysis and deep understanding of the dynamics underlying any business process, contextual to any auditing activity: delimitation of the boundaries of a system (or problem), definition of variables and cause-effect relationships, activity scheduling, cost analysis and resource optimization.

Detailed program

The nature and the importance of operations research in the context of business organizations: modelling, optimization of resources and teamwork. Steps of any modelling process. Overview of some important models of operations research.

Linear programming. Formulation of the problem, fundamental assumptions, graphic resolution. Theory of duality and its economical interpretation. Sensitivity analysis. Introduction to the simplex method. Analysis and discussion of some study case. Software for linear programming.

Outline of some quantitative methods to support business decisions. Order of preference on a set of possible scenarios. Multi-criteria decisions.

Dynamics of business systems. Concepts of system and system complexity. Dynamic manifestations of a system: feedback circuits and their polarity. Systemic archetypes. Discussion of some case studies. Level variables and flow variables to describe the dynamics of a business system. Time delays between causes and effects, delays in information flows.

Outline of dynamics of network-based systems and their modelling by means of graphs. Nodes and connections.

Methods for project management. The networks of AoA and AoN activities. Scheduling of project activities by means of Gantt diagrams. Critical path. Time-cost analysis and possible corrective actions. The PERT. Discussion of some study case.

Prerequisites

Basics of mathematics, in particular analytic geometry and linear algebra.

Teaching methods

5 credits corresponding to 35 hours of front teaching, which includes both theoretical topics and exercise class to enforce the theoretical part.

The teaching activity is supported by an e-learning platform, to which every student must register and log-in by his university credentials.

Assessment methods

Written test (approved with a grade of at least 18/30) lasting about 2 hours, which consists of a series of open questions on theoretical contents and exercises that require the application of the theory to solve simple problems.

The questions are intended to verify the effective theoretical preparation and the logical-deductive ability, while the exercises are proposed to verify the acquired "problem solving" competence.

Alternatively, for attending students, two partial written tests will be held during the course.

The oral exam is optional, namely it can be requested by the student or by the teacher.

During the oral exam the student can present a short report on a specific topic not covered in class, previously agreed with the teacher.

Textbooks and Reading Materials

Slides in pdf format for all the topics will be available.

The scientific literature is rich of books and papers on the topics explained during the lectures, most of which are very thorough and go beyond the scope of the course. The following texts are recommended:

- Stefani, Torriero, Zambruno. Matematica finanziaria con elementi di programmazione lineare, Giappichelli (2007).

- Carcano. Programmazione lineare, Datanova (2004, recommeded for examples and exercises).

- Bellenzier L., Grassi R., Stefani S., Torriero A., Metodi quantitativi per il Management, Esculapio (2012).

- D'Ercole, Stefani. Modelli matematici per le decisioni aziendali, Esculapio (2008).

Semester

Frst semester, according to the academic calendar.

Teaching language

Italian