ESG UQÀM

Syllabus
MBA 8419 - Decision Making Technology

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General Description

The overall objective of this course is to introduce MBA students to the main quantitative technologies, developed by the operations research field, that are used to provide decision support to managers in various organizational settings. These technologies are largely applied in the context of planning and managing both the operations and the resources of organizations and companies that produce goods and services. In the present course, the technologies that will be presented are the following: 1) linear programming, 2) numerical simulation, and 3) distribution and network models. Emphasis will be placed on how to formulate decisional problems and how the different technologies can be used to perform numerical analysis that are meaningful in a decision support context. Various examples, appearing in the management of operations, logistics and human resources, will be used to demonstrate how the various technologies are applicable in practical settings.

Reference:

- David R. Anderson, Dennis J. Sweeny, Thomas A. Williams, Jeffrey D. Camm and Kipp Martin (2011), *An Introduction to Management Science Quantitative Approaches to Decision Making*, South-Western Cengage Learning, 13th Edition.
- **NOTE:** The specific chapters are provided via the Moodle website associated with the course.

Software:

- EXCEL. Specifically, the *Solver* macro and the *inverse* statistical functions will be introduced and used to perform the optimization and simulation functions, respectively.

Evaluation:

For this course, one a single element is used for the evaluation:

- ***Individual in-class exam: 100%.*** Students will do a single exam in-class. This exam is individual, meaning that no communication, no collaboration, and no copying among the students is allowed.

Grades: the following table shows the equivalences

A+ is equivalent to 4.3 out of 4.3 (90 – 100)/100	A is equivalent to 4.0 out of 4.3 (85 – 90)/100	A- is equivalent to 3.7 out of 4.3 (80 – 84)/100
B+ is equivalent to 3.3 out of 4.3 (77 – 79)/100	B is equivalent to 3.0 out of 4.3 (73 – 76)/100	B- is equivalent to 2.7 out of 4.3 (70 – 72)/100
C+ is equivalent to 2.3 out of 4.3 (65 – 69)/100	C is equivalent to 2.0 out of 4.3 (60 – 64)/100	Failing grade: E (i.e., Échec or *Fail*) is equivalent to 0 out of 4.3 (0 – 59)/100

Session no.1

- **Introduction**

  An introduction to the course will be provided here (i.e., the general objectives, content and the evaluation will be presented). In addition, the field of operations research will be defined (including a brief history) and the general methodological approach to provide decision support will also be presented. Finally, a list of illustrative examples will be provided to introduce the different technologies that will be presented in the following sessions.

Session no.2

- **Linear Programming**

  This presentation will include: 1) an introduction to the principles of how given decisional problems can be formulated as linear optimization models, 2) the general guidelines of the solution approach that is used to obtain optimal solutions for these models and 3) a tutorial on how to apply the Solver macro to solve linear models. Different examples, dealing with aggregated planning problems, will be provided to illustrate this technology.

- **References:** Chapters 3 and 4.

Session no.3

- **Distribution and Network Models**

  In this session, network optimization models will be presented. Specifically, students will learn how various organizational problems can be formulated as models where specific flows (e.g., material, people, goods, etc.) are transported through a network while minimizing costs. The focus will be on showing how networks (i.e., a set of nodes that are connected by arcs) can be used as a modeling tool and how adapted EXCEL spreadsheets can be constructed to solve the resulting models. A wide gamut of examples, taken from the fields of logistics and operations management, will again be provided to show how this technology is applied.

- **Reference:** Chapter 6.

Session no.4

- **Integer Linear Programming**

  In this presentation, the usefulness of integer restrictions in linear programming will be presented. In this context, it will be shown how integer variables (both general discrete and binary) can properly formulate a wide variety of decisions appearing in organizational settings. Different problems that include selection, distribution and scheduling decisions, will be presented to illustrate how this technology is applied. Finally, a discussion on how to solve the resulting integer optimization models will also be provided.

- **Reference:** Chapter 7.