SE2700
Modeling for Decision Making

Professor: Vincent Mousseau

Language of instruction: French – **Number of hours**: 36 – **ECTS**: 3

Prerequisites: None

Period: S8   Elective 09   February to March   IN28IE2, SEP8IE2

Course Objectives

Decision making is one of the major activities of engineers and managers. More than ever, in a globalised context, in complex and uncertain situations, managers are to make decisions at strategic, tactical and operational levels, which involve high stakes (financial, human, etc.) for the firm competitiveness.

In order to cope with such complex decision problems, future engineers and managers need to master concepts and methodologies which allow to formalize decision problems. This course aims at introducing several classical models that make it possible to represent and solve decision problems in various contexts (decision under uncertainty, multiple criteria decision)

On completion of the course, students should be able to

✧ master several methods/models for decision making/aiding

✧ operationalize these methods within the context of decision problems in actual organizations/firms

✧ step back and have a critical view on decision making methods, hence analyzing their merits and limitations

Course Contents

✧ Introduction to decision making/decision aiding, basic concepts

✧ Decision in presence of risk, decision under uncertainty, utility theory, decision trees

✧ Decision with multiple criteria and preference modeling, introduction to several basic aggregation procedures

✧ Presentation of models involving various modeling tools (graphs, linear programming, etc.); presentation of modeling and resolution tools

✧ Data Envelopment Analysis

✧ Project to put the theory in practice

A video presentation of this course is available at http://www.lgi.ecp.fr/pmwiki.php/PagesPerso/SE2700

Course Organization

The course are roganized in a "flipped classrom". Lectures takes the form of a serie of vidéos which the sudent have to watch before the day of the class. the points taht are unclear of that the students did'nt understand and discussed, and then the rest of the time is devoted to exercises. Such way of proceeding should enable each student to adapt his/her progress in the course and benefit as much as possible from the course.

Lectures: vidéos which the students should watch before the class

Exercises: 24 hr,

Labwork: 9 hr,

Exam: 3 hr

Teaching Material and Textbooks

✧ Ph. Vincke. Multicriteria decision-aid, Wiley, 1992.

✧ C. Guéret, C. Prins, M. Sevaux. Programmation linéaire, 65 problèmes d'optimisation modélisés et résolus avec Visual Xpress, Eyroles, 2003.

✧ H.P. Williams. Model building in mathematical programming. Wiley, 1999 4th ed.

✧ D. Vanderpooten. Aide à la décision : une approche par les cas. Ellipses, 2002, 2nd ed.

✧ W. Cooper, L. Seiford, and K. Tone. Introduction to Data Envelopment Analysis and its use, Springer, 2006.

Resources

videos before the lecture

list of exercices during the class

Evaluation

2-hr written exam (with documents allowed) and presentation of a project on a case