

DECISION ANALYSIS

COURSE OUTLINE

1. Introduction

Making decisions is a crucial element of a manager's work. Making a decision can be difficult and good decision making matters – for the decision maker and his or her surroundings, other people and entire organizations.

Learning more about the different elements of decisions, how decisions can be structured and analysed can help us improve our decision process and the outcomes.

2. Objectives

We will study the decision making process, with a focus on (i) uncertainty and risk and (ii) on time. These are fundamental elements of decisions and influence the complexity of decision-making. We will mostly study individual decision-making. Some time is dedicated to group decision-making and its specific characteristics.

3. Learning Outcomes

- Simplify a decision and reflect its main characteristics in a decision tree.
- Specify the consequences of an alternative.
- Create and analyze the risk profile of a decision.
- Relate the risk profile to the risk taking capacity and relevant circumstances of the decision maker.
- Project how changes in the decision characteristics would change the risk profile and the preferred course of action. ("What if?" questions).
- Distinguish different risk preferences and how they impact the preferred course of action.
- Evaluate decision-making habits with respect to standards of rationality and detect biases.
- Apply probability judgments to managerial decisions.
- Decide whether critical information for a decision is missing.
- Categorize uncertainties with respect to their value of information.
- Apply the concept of simulation to decisions.
- Perform comparative investment decision analysis. Use simplified approaches through the NPV and IRR concepts and detect possible shortcomings.
- Determine optimal order quantities under uncertain demand.

4. Competences

This course builds and reinforces the following competences:

- Students should possess and understand knowledge that provides the basis or opportunity for originality in the development and/or application of ideas, often in a research context
- Students should know how to apply the knowledge acquired and their problem-solving capacity in new and little-known settings within broader (or multidisciplinary) contexts related to their area of study
- Students should be able to integrate knowledge and deal with the complexity of making judgements based on information that is incomplete or limited, but includes considerations of the social and ethical responsibilities linked to the application of the students' knowledge and judgements
- Students should know how to communicate their conclusions and knowledge and the ultimate reasons that support them to specialized and unspecialized audiences in a clear, unambiguous way
- Identifying and effectively dealing with information that is relevant to the job (Information Management)
- Making appropriate decisions at the right time (Prudence).
- Understanding and using criteria to apply quantitative analysis and decision-making tools. Understanding the assumptions implicit in models, as well as the limitations and risks involved when models are put into practice
- Measuring and being aware of one's own attitude toward risk and uncertainty. Learning methods to identify risk factors, evaluate them and study their impact on decisions. Carrying out awareness studies, advanced simulations and scenario analysis.

5. Content and Methodology

The course is divided in three parts: (1) Introduction and classical techniques, which include decision structuring, decision under uncertainty, risk attitudes and the value of information (2) Time Value of Money (NPV, IRR) and (3) Monte Carlo Simulation and Group Decisions. Within the parts we will address both analytical and psychological aspects.

Course is a combination of case discussions (60%), lectures (20%), and in class exercises (20%).

6. Evaluation

Grading is based on contribution to in-class learning (20%), class assignments (15%), a midterm exam (25%) and a final exam (40%).

Learning outcomes will be measured in the following way:

Mid-term and final exam with decision making problems that require translating a verbal description into a decision tree (outcomes i and ii), develop and evaluate risk

profiles (iii-v), discuss risk preferences and biases (vi and vii), calculate value of information (x), impact of imperfect information (viii and ix). Simulation problems setup, running and analysis (xi). Investment analysis and order quantity problems (xii and xiii).

Hand in of simulation exercises (outcome xi)

Hand in of discounting exercises (outcome xii)