

**IE 405: Decision Analysis
Spring 2025**

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Office Hours: by appointment

Lectures: Tuesday: 11.40-13.30 in FENS L045
Wednesday: 8.40-9.30 in FENS L045

Teaching Assistants

Graduate TAs: Alize Yaprak Gül (alize.gul@sabanciuniv.edu), Berk İslim (berk.islim@sabanciuniv.edu)

Course Description

The course provides a broad practical overview of topics and techniques in the field of decision analysis. As an engineering course for undergraduate students, the course will address advanced technical subjects that can be found in management science and operations research domains. At the end of the term, the students will be able to formulate decision-making problems that have multiple decisions in time, uncertain events, and conflicting objectives. We will also discuss certain behavioral issues related to decision making.

Textbook

Making Hard Decisions – with Decision Tools, by Robert T. Clemen, & Terence Reilly (2nd or 3rd Edition)

Grading

Midterm (April 15 at class time)	45%
Final (comprehensive)	55%

Important Rules:

- You have to have a valid reason for not taking an exam. If a proof such as a medical report is not brought to me before or within the first three days of the exams you will NOT be given a make-up exam and will be assumed to score 0 in the exam you have missed. The make-up exams may need be scheduled after the final exam and it may be comprehensive.
- Be respectful to your TA's! The professor will deal with the objections.

List of Topics *

* Weeks below are not strict but rough guesses

1) Structuring Decisions (Weeks 1 to 6)

- Elements of decision problems (objectives, alternatives, consequences etc.)
- Influence diagrams/Decision trees
- Sensitivity analysis
- Bayesian inference
- Value of information

2) Modeling Uncertainty (Weeks 7- 11)

- Subjective probability
- Monte Carlo simulation
- Decision heuristics and biases
- Judgment under uncertainty

3) Modelling Preferences (Weeks 11-14)

- Risk attitudes
- Utility theory
- Conflicting objectives
- Analytical Hierarchy Process – AHP

Computational Part

Some computation using Python is planned.