

# **Syllabus IE405, Decision sciences**

## **Spring semester 2021-2022**

### **1 Instructor and Teaching Assistants**

Instructors    Hans Frenk  
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Teaching assistants    Fatemeh Mahroo    fatemeh@sabanciuniv.edu    IE405R-B Wednesday  
                                 Nazire Karabulut    nkarabulut@sabanciuniv.edu    IE405R-A Tuesday

### **2 Office hours**

1. Office hours instructor: By appointment. Preferable after lecture.
2. Office hours TA's: by appointment.
3. One week before the exam additional office hours will be held.

### **3 Time and Venue**

#### 1. Lectures

Thursday    18.40 – 19.30    Zoomlink is on Sucourse+

Friday        14.30 – 16.30    Zoomlink is on Sucourse+

#### 2. Recitations

IE405R-A    16.40 – 17.30 Tuesday Nazire Karabulut    Zoomlink is on Sucourse+

IE405R-B    12.40 – 13.30 Wednesday Fatemeh Mahroo    Zoomlink is on Sucourse+

The starting time of the recitations will be announced on Sucourse+.

## 4 Textbook

**Main text book:** Making Hard Decisions – with Decision Tools, by Robert T. Clemen, Duxbury (2nd or 3rd Edition) Link for order (from Homer bookstore) <https://www.homerbooks.com/urun/making-hard-decisions-with-decisiontools> IE 405

**Additional reading:** Foundations of Decision making, R.A Howard,A.E Abbas, Pearson, 2016

## 5 Lecture slides

Slides will be uploaded on SUCourse+ in folder lecture notes and exercises in folder recitations

## 6 Course Description

This 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 different objectives. The preliminary course topics covers the material listed below. We might not be able to discuss the Advanced Topics due to time limitations.

### List of Topics

#### Structuring Decisions

- Elements of decision problems (objectives, alternatives, consequences etc.)
- Decision trees
- Sensitivity analysis

#### Modeling Uncertainty

- Probability review
- Bayesian inference
- Value of information
- Subjective probability
- Monte Carlo simulation

#### Modelling Preferences

- Risk attitudes

- Utility theory
- Conflicting objectives

#### Advanced Topics

- Analytical Hierarchy Process – AHP
- Decision heuristics and biases
- Judgment under uncertainty

## 7 Recitations

- Students must attend the recitation sessions they have registered for. No attendance will be taken and no recording. It is advised that students attend the recitation.
- Recitations are supposed to be an active learning environment. Your behavior will be monitored by the TA's. If you misbehave during recitations, this will be reported to the instructor and appropriate measures will be taken. In extreme cases, this may even affect your course grade.
- part of the solutions will be uploaded to Sucourse+ after recitation sessions

## 8 Exams and Course Policies

1. There will be one midterm and one final. There will be no makeup for the midterm. The weight of each midterm is 50%, and that of the final is 50%.

The date and times of the midterm is as follows.

Midterm date: November 12 14.40-16.10 (90 minutes due to Covid regulations) rooms FENS L061, L062, L063: Assignment to the rooms will be announced one week before on Sucourse+. All students are expected to come.

Final exam will be announced by the Student Resources.

2. Make-up policy

There will be a make-up exam after the final exam. The make-up exam grade will replace all your missing exam grades.

If you miss an exam, you do NOT need to contact the instructors to explain the reason.

It is **STRONGLY** recommended that you take both midterms and final as scheduled. The make-up exam will be cumulative and more difficult.

The date of the make-up exam will be announced after the final exam. It will most likely be within two days after the end of the final exam period.

3. Students are expected to answer exam questions using their own sentences, based on the concepts discussed in our lectures. Exams are not "research assignments". Students cannot use text from online or offline resources. Our lecture presentations or other course material can be used as references, but their text shall not be simply copied and pasted. It is expected but still unclear that the exams will not be online but in-class. If a student cannot come to the university to take the exam he should ask permission from the deans office to take an online exam. The teacher cannot decide on this. Due to the uncertain covid situation it is still unclear what will happen. If the exams are in-class point 5 and 6 will not be applied.
4. Answers will be checked against plagiarism through TurnItIn software. Students submitting very similar answers to a question will raise suspicion. Such an act cannot be defended with statements such as "we studied and prepared answers to potential questions together". Answers that are irrelevant to our lecture discussions may also raise suspicion of web search during the exam, or the use of third-party solution services.
5. **Students whose exams answers seem suspicious can be called for an oral exam with the instructor. The oral exam questions will not be limited only to the suspicious answers in exams; the instructor may ask other questions to evaluate the student's understanding of course material. If the student performs badly in the oral exam he will not pass this course and receives F.**
6. It is students' responsibility to follow all the announcements made in class and those made via SUCourse+.
7. Do not underestimate this course. It might be different from the past. It is advised that you study regularly every week next to going to classes and attending the recitation session. If you do not fully understand the material you should make an appointment with your TA or your instructor immediately after class.
8. Honesty is regarded the best policy