BA in Management Program
Spring 2022

OPIM 410 Decision Making Under Uncertainty

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Office Hours: By appointment. All appointment requests should be made via email. In your appointment request, include (i) purpose of the meeting, and (ii) at least three alternative meeting times. I will respond to you by email. Do not hesitate to email me when you have questions about the course.

Teaching Assistants: TBA
Office Hours: TBA

Type	Time	Days	Where
Class	11:40 - 13:30	Tuesday	SBS L018
	10:40 – 11:30	Wednesday	FENS G035

Course Objective:
OPIM 410 Decision Making Under Uncertainty is about decision science, which is an interdisciplinary field that derives from economics, psychology and quantitative modeling. The course is designed as an introduction to the basic concepts, principles and methods of decision sciences; our main focus is going to be trying to answer the question: "*how can we help people make better decisions (when there is some uncertainty present)*?". Over the years, several tools, methods and models have been proposed to help people make better decisions under uncertainty. The most popular of these tools are decision trees and simulation. Using decision trees and simulation, as well as various other approaches, we will learn to identify a decision making problem, break it down to more manageable parts, and then pick the best alternative. While doing so, we shall also have the chance to discuss the concept of randomness, especially why it is so important, and how it can be measured. We will further talk about the role of information, and how it impacts a decision making situation.

The course requires some familiarity with quantitative modeling techniques and basic probability concepts. However, no high level mathematics is required.

Learning Outcomes:

By the end of this course, you will be able to:

(1) Identify a decision problem and break it down to manageable parts

(2) Recommend the best course of action to take in a given decision making situation using different tools

(3) Conduct and interpret the insights from sensitivity analysis

Course Material:

There is no textbook for this course. The main material for the course is going to be slides, and Excel sheets, which will all be posted on SUCourse. However, there are a number of excellent textbooks, and books aimed at the general public/practitioners on decision making. Below is a (non-exhaustive) list that may guide you, should you require extra reading material (those marked with * are available in the library):

- *Making Hard Decisions: An Introduction to Decision Analysis* by Robert T. Clemen*
- *Decision analysis: introductory lectures on choices under uncertainty* by Howard Raiffa*
- *Judgment and Decision Making: Psychological Perspectives* by David Hardman
- *Judgment in Managerial Decision-Making* by Max. H. Bazerman*
- *Decision Analysis for Management Judgment* by Paul Goodwin and George Wright*
- *Value-focused thinking: a path to creative decision making* by Ralph Keeney*
- *Conflicting objectives in decisions* by David Bell
- *Decision making: descriptive, normative, and prescriptive interaction* by David Bell
- *Judgment under uncertainty: heuristics and biases* by Daniel Kahneman*
- *Choices, Values and Frames* by Daniel Kahneman and Amos Tversky*
- *The winner's curse: paradoxes and anomalies of economic life* by Richard Thaler*
- *The Irrational Economist: Making Decisions in a Dangerous World* by Erwann Michel-Kerjan and Paul Slovic
- *Predictably Irrational: The Hidden Forces That Shape Our Decisions* by Dan Ariely*
- *Nudge: Improving Decisions About Health, Wealth, and Happiness* by Richard H. Thaler and Cass R. Sunstein*
- *Misbehaving: The Making of Behavioural Economics* by Richard H. Thaler
- *The Undoing Project: A Friendship That Changed Our Minds* by Michael Lewis

- *Thinking, Fast and Slow* by Daniel Kahneman*

Course Web:
We will post the slides, reading material, deadlines, assignments, cancellations, postponements, in short, everything on SUCourse throughout the term. **Please check it frequently to see if new material has been placed.**
Note that Sabanci University uses a very powerful web-based tool called Turnitin. Turnitin is the worldwide standard in online plagiarism prevention. It allows instructors to compare student papers against a database composed of millions of articles. Every paper you submit will be scanned by Turnitin, and results will be reflected in your grades.

Software:
Microsoft Excel

Instructional Design:
The objective of the course is to make the lectures as interactive as possible. The students can download and upload files from the course website (on SUCourse) during classes. Students will be able to work on in-class exercises and submit their work at the end of the class and follow instructor-done examples on their own computers

Grading:

Deliverable	Due date	Grade percentage
Midterm I	April 12	25%
Midterm II	May 24	25%
In-class activities	Throughout the term	25%
Term project:		
Proposal & proposal presentation	March 29 & 30	10%
Final presentation	May 31 & June 1	5%
Final report	June 21	10%
TOTAL		100%

Requirements:
The assessment of this course consists of: 2 midterm exams, 1 term project, and several in class activities. All are detailed below.

Midterm I: Midterm I will be on topics we have covered up until that date. This exam will be closed book and closed notes. The questions will include short-essays, analysis and modeling done in Excel. The answers will be collected as MS Excel workbooks.
Date: **April 12**

Midterm II: Midterm II will be on topics we have covered after Midterm I up until that date. This exam will be closed book and closed notes. The questions will include short-essays, analysis and modeling done in Excel. The answers will be collected as MS Excel workbooks.
Date: **May 24**

In-class activities: Throughout the term, we will have several in-class activities during the class meetings, which will be submitted via SUCourse at the end of the session.

Term project: The project consists of: (1) a proposal & its presentation (proposal report: maximum 5 pages, details below; presentation: maximum 5 minutes - due date: **March 29 & 30**), (2) a presentation (maximum 10 minutes, on your project, before submitting the report– due date: **May 31 & June 1**), and (3) a final report (maximum 15 pages without the Appendix – due date: **June 21**). You can find the details about the requirements of each written installment of the project below. The project will be done in groups of 5. You should form your groups by **March 15**, and fill and submit the Group Submission Form on SUCourse. If you have not formed a group by this date, you will be assigned to a group by the instructor. All members of the group need to take part in the presentations.

Proposal: For the proposal, pick a decision problem about **sustainability**. This problem can be anything related to sustainability, but it needs to fulfill the criteria of what constitutes a decision problem we will see in class. Your decision maker can be a general group (such as the students of Sabancı University) or a specific person (such as yourself). You will, in the subsequent installments of the project, model this problem using a decision tree and simulation, solve it and conduct various types of analysis; so while picking a problem, keep this in mind. For this part of the project, what you need to do is (1) describe your problem in detail, (2) explain why it is a decision making problem, (3) outline the uncertainties, decisions and consequences, (4) mention any simplifying assumptions you are making, (5) why you chose this problem (i.e. given that you will eventually solve it for the best solution and do quite a bit of analysis on it, why should we care about making a really good decision?), (6) how you intend to come up with the parameters of you decision problem,

such as the specific values of the probabilities, consequences etc. (you do not need to give the specific values, but you need to sketch your general approach).
Length: maximum 5 pages
Due date: **March 29**

Final Report: The final report should have the following outline:

1. **Introduction:** In this section you should briefly explain the problem, and the motivation for studying it.
2. **The Problem:** In this section, you should explain your problem in detail, stating the alternatives available, the uncertainty present and the objective & consequences (in essence, a recap of your proposal, incorporating the feedback provided by the instructor).
3. **The Model:** In this section, you should provide the model you built. If you use the decision tree approach, you need to provide this tree - the figure can be delegated to the appendix if you want, but you should explain the alternatives on the branches of the decision tree, the consequences, and how you came up with the probabilities in detail. If you use simulation, you should clearly explain the components of your model, and given an example run.
4. **The Solution:** In this section, you should find the best choice for the decision maker.
5. **Value of Information:** This section should include the calculation of the maximum price your decision maker would be willing to pay for information on the uncertainty he is facing, and a discussion.
6. **Conclusion:** In this section, summarize what you have done, and evaluate your findings.
7. **References:** List of any material you used to prepare the paper (books, articles, web pages etc.).
8. **Appendix:** Figures, tables, data you have used.

Length: maximum 15 pages (excluding the appendix and references).
Due date: **June 21.**

Make up policy:
If you cannot take a midterm due to a documented health problem, or a similar issue, you should contact the instructor **before** the exam. If you miss one of the midterms, you grade from the other midterm will count towards both midterms.
There will be **no make-up** for missed in-class activities, assignments and quizzes.
All written assignments should be submitted on SUCourse at the indicated hour on the scheduled due date. Late submissions will not be accepted.

Academic Honesty:

Learning is enhanced through cooperation and as such you are encouraged to work in groups, ask for and give help freely in all appropriate settings. At the same time, as a matter of personal integrity, you should only represent your own work as yours. Any work that is submitted to be evaluated in this class should be an original piece of writing, presenting your ideas in your own words. Everything you borrow from books, articles, or web sites (including those in the syllabus) should be properly cited. Although you are encouraged to discuss your ideas with others (including your friends in the class), it is important that you do not share your writing (slides, MS Excel files, reports, etc.) with anyone. Using ideas, text and other intellectual property developed by someone else while claiming it is your original work is *plagiarism*. Copying from others or providing answers or information, written or oral, to others is *cheating*. Unauthorized help from another person or having someone else write one's paper or assignment is *collusion*. Cheating, plagiarism and collusion are serious offenses that could result in an F grade and disciplinary action. Please pay utmost attention to avoid such accusations.

Classroom Policies and Conduct:

Sabancı BA in Management program values participatory learning. Establishing the necessary social order for a participatory learning environment requires that we all:

- Come prepared to make helpful comments and ask questions that facilitate your own understanding and that of your classmates. This requires that you complete the assigned material for each session before class starts.
- Listen to the person who has the floor.
- Join the class on time.
- Use your laptop only for class activities such as taking notes or referring to a spread sheet.

You are expected to participate in class discussions, answer and ask questions. These questions are intended to help you better understand the concepts and learn the mechanics of specific solutions approaches. Please note the importance of coming to classes prepared. Please refrain from activities that will distract other fellow students and the instructor.

Course Schedule:

Week 1	**Dates:**	**March 1 & 2**
	Topic:	Introduction to decision making under uncertainty: background, basic concepts & definitions, components of decision making

Week 2	**Dates:**	**March 8 & 9**
	Topic:	Systematic approaches to decision making: Some simple approaches
Week 3	**Dates:**	**March 15 & 16**
	Topic:	Making decisions with chance and randomness, objective vs. subjective approach
Week 4	**Dates:**	**March 22 & 23**
	Topic:	Decision making under uncertainty with decision trees
Week 5	**Dates:**	**March 29 & 30**
	Topic:	Proposal presentations
Week 6	**Dates:**	**April 5 & 6**
	Topic:	Decision making under uncertainty with decision trees
Week 7	**Dates:**	**April 12 & 13**
	Topic:	**MIDTERM I**
Week 8	**Dates:**	**April 19 & 20**
	Topic:	Decision making under uncertainty with decision trees
Week 9	**Dates:**	**April 26 & 27**
	Topic:	Guest speaker
Week 10	**Dates:**	**May 10 & 11**
	Topic:	Simulation
Week 11	**Dates:**	**May 17 & 18**
	Topic:	Simulation
Week 12	**Dates:**	**May 24 & 25**
	Topic:	**MIDTERM II**
Week 13	**Dates:**	**May 31 & June 1**
	Topic:	Final presentations
Week 14	**Dates:**	**June 7 & 8**
	Topic:	Review and wrap up