University of St.Gallen

Course and Examination Fact Sheet: Autumn Semester 2019

5,253: From Data to Decision

ECTS credits: 3

Overview examination/s
(binding regulations see below)
Decentral - Written examination (50%, 60 mins.)
Decentral - Group examination paper with presentation (all given the same grades) (50%)

Attached courses
Timetable -- Language -- Lecturer
5,253,1.00 From Data to Decision -- Englisch -- Epper Thomas

Course information

Course prerequisites

- - Basics in statistics and probability
- - Basic knowledge in statistical programming (R, Python or similar)

Course content

Decisions, whether they involve economic choice, business decisions or policy making, are based on data and prior beliefs. Data may be sparse, comprehensive, or available in form of streams. As we never observe the full truth (there are only finitely many observations and there is some lower bound on measurement precision), typical decisions are subject to epistemic uncertainty. This poses a number of questions:

- How can decision and policy makers reach robust decisions when data availability is restricted?
- How sensitive are choices with regard to our knowledge of the world?
- How do we make decisions when there is considerable ambiguity involved with regard to the actual consequences or the causal mechanism determining them?
- How can private information, such as subjective judgments or prior beliefs, be elicited? How can this information be integrated into the decision process?

This course addresses these questions. It advocates a data-driven approach to decision making by combining methods from decision analysis and data science. The course extends beyond classic scenario- and sensitivity-based approaches of decision making under uncertainty, and introduces ways to deal with data that is limited or becomes only available gradually over time. It's emphasis is on decision making in a world full of ambiguity and decision making in settings where there is a lack of knowledge on correlations and causal mechanisms generating the actual outcomes. The decision making part of the course is combined with an introduction to approaches for eliciting prior beliefs and expectations about future states of the world.

The objective of the course is to familiarize students with the foundations of the analysis methods and to equip them with the necessary skills to make their own (robust) decisions. Specifically, it will cover the following topics:

- Bayesian decision making and inference
- Probabilistic reasoning
- Modeling uncertainty with probability
- Decision criteria and loss functions
- Ambiguity and non-additive probabilities
- Imputing missing values
- Measurement of beliefs and elicitation of private information
- Quantifying information

- Robust control and perturbation-invariant decisions

Students learn how to apply the methods, tools and algorithms to economic decision problems using case studies.

Course structure
Weekly lecture

Course literature
Handouts and articles introducing the relevant concepts. All resources will be provided via Canvas.

Additional course information
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Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form
Decentral - Written examination (50%, 60 mins.)

Remark
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Examination-aid rule
Extended Closed Book
The use of aids is limited; any additional aids permitted are exhaustively listed under "Supplementary aids". Basically, the following is applicable:

- At such examinations, all the pocket calculators of the Texas Instruments TI-30 series and mono- or bilingual dictionaries (no subject-specific dictionaries) without hand-written notes are admissible. Any other pocket calculator models and any electronic dictionaries are inadmissible.
- In addition, any type of communication, as well as any electronic devices that can be programmed and are capable of communication such as notebooks, tablets, PDAs, mobile telephones and others, are inadmissible.
- Students are themselves responsible for the procurement of examination aids.

Supplementary aids
Standard calculator

Examination languages
Question language: English
Answer language: English

2. Examination sub part (2/2)

Examination time and form
Decentral - Group examination paper with presentation (all given the same grades) (50%)

Remark
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Examination-aid rule
Term papers

- Term papers must be written without anyone else's help and in accordance with the known quotation standards, and

they must contain a declaration of authorship.
- The documentation of sources (quotations, bibliography) has to be done throughout and consistently in accordance with the APA or MLA standards. The indications of the sources of information taken over verbatim or in paraphrase (quotations) must be integrated into the text in accordance with the precepts of the applicable quotation standard, while informative and bibliographical notes must be added as footnotes (recommendations and standards can be found, for example, in METZGER, C. (2017), Lern- und Arbeitsstrategien (12th ed., Cornelsen Schweiz).
- For any work written at the HSG, the indication of the page numbers both according to the MLA and the APA standard is never optional.
- Where there are no page numbers in sources, precise references must be provided in a different way: titles of chapters or sections, section numbers, acts, scenes, verses, etc.
- For papers in law, the legal standard is recommended (by way of example, cf. FORSTMOSER, P., OGOREK R. et SCHINDLER B. (2018, Juristisches Arbeiten: Eine Anleitung für Studierende (6. Auflage), Zürich: Schulthess, or the recommendations of the Law School).

Supplementary aids
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Examination languages
Question language: English
Answer language: English

Examination content
All parts of the course. Specifically, this includes the handouts/slides of the course, all expositions, examples and notes presented during the lectures, the articles and resources explicitly marked as "mandatory readings", the critical discussions of the papers in the second half of the course.

Examination relevant literature
All literature will be made available via Canvas before Dec 14, 2019.

Please note

Please note that this fact sheet alone is binding and has priority over any other information such as StudyNet (Canvas), personal databases or faculty members' websites and information provided in their lectures, etc.

Any possible references and links within the fact sheet to information provided by third parties are merely supplementary and informative in nature and are outside the University of St.Gallen's scope of responsibility and guarantee.

Documents and materials that have been submitted no later than the end of term time (CW51) are relevant to central examinations.

Binding nature of the fact sheet:

- Information about courses and examination time (central/decentral) and examination typestarting from the beginning of the bidding on 22 August 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for decentral examinations after the 4th semester week on 14 October 2019
- Information about examinations (examination aid regulations, examination content, examination-relevant literature) for central examinations as from the starting date for examination registration on 4 November 2019

Please consult the fact sheet again after these deadlines have expired.