



## Course and Examination Fact Sheet: Autumn Semester 2020

### 5,253: From Data to Decision

ECTS credits: 3

#### Overview examination/s

(binding regulations see below)

Central - Written examination (50%, 60 mins.)

Examination time: inter-term break

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

Examination time: term time

#### Attached courses

Timetable -- Language -- Lecturer

[5.253.1.00 From Data to Decision](#) -- Englisch -- [Epper Thomas Frank](#)

#### Course information

#### Course prerequisites

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

#### Learning objectives

The objective of the course is to familiarize students with the foundations of decision making and corresponding analysis/inference methods. The course equips students with the necessary skills to make and critically assess (policy) decisions. The specific topics covered by the course are listed below.

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

#### 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 become available over the course in time. 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.



## Course structure

The course consists of two parts: In the first part of the course, students get introduced to basic theory and relevant decision making biases.

The following topics will be covered:

- 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

(The selection of topics is subject to possible change, depending on the audience's interest.)

Students will form groups and apply specific methods to a case. The group work will be presented in the second part of the lecture. A term paper summarizes the core findings.

Note: We plan face-to-face sessions, i.e. a regular course on campus. However, due to the current uncertain situation the lectures will be recorded and made available for streaming during the days following the lecture. The same holds for the student presentations, which may be moved to an online media - depending on the restrictions that apply.

## Course literature

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

## Additional course information

In the case of the President's Board having to implement new directives due to the SARS-CoV-2 pandemic in AS2020, the course information listed above will be changed as follows:

- The course is conducted online via the platform Zoom;
- The lecturer informs via StudyNet on the changed implementation modalities of the course;

The examination information listed below would be changed as follows:

- The presentations are conducted online and are being recorded;

## Examination information

### Examination sub part/s

#### 1. Examination sub part (1/2)

##### Examination time and form

Central - Written examination (50%, 60 mins.)

Examination time: inter-term break

##### 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, 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

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## 2. Examination sub part (2/2)

### Examination time and form

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

Examination time: term time

### 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 which is a published template in StudentWeb.

The documentation of sources (quotations, bibliography) has to be done throughout and consistently in accordance with the chosen citation standard such as APA or MLA.

For papers in law, the legal standard is recommended (by way of example, cf. FORSTMOSER, P., OGOREK R. et SCHINDLER B., *Juristisches Arbeiten: Eine Anleitung für Studierende*, newest edition respectively, or according to the recommendations of the Law School).

The indications of the sources of information taken over verbatim or in paraphrase (quotations) must be integrated into texts 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., *Lern- und Arbeitsstrategien*, newest edition respectively).

For any work written at the HSG, the indication of the page numbers is mandatory independent of the chosen citation standard. 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.

## Supplementary aids

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## Examination languages

Question language: English

Answer language: English

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## 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 presentations in the second half of the course.

## Examination relevant literature

All literature will be made available via Canvas before Dec 14, 2020.

### Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are binding and takes precedence over other information, such as information on StudyNet (Canvas), on lecturers' websites and information in lectures etc.

Any references and links to third-party content within the fact sheet are only of a supplementary, informative nature and lie outside the area of responsibility of the University of St.Gallen.

Documents and materials are only relevant for central examinations if they are available by the end of the lecture period (CW51) at the latest. In the case of centrally organised mid-term examinations, the documents and materials up to CW 42 are relevant for testing.

Binding nature of the fact sheets:

- Course information as well as examination date (organised centrally/decentrally) and form of examination: from bidding start in CW 34 (Thursday, 20 August 2020);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 12 October 2020);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 44 (Thursday, 29 October 2020).