



## Course and Examination Fact Sheet: Autumn Semester 2020

### 7,310: Data Analytics I: Predictive Econometrics

ECTS credits: 4

#### Overview examination/s

(binding regulations see below)

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

Examination time: inter-term break

Decentral - examination paper written at home (individual) (25%)

Examination time: term time

Decentral - Group examination paper (all given the same grades) (15%)

Examination time: term time

#### Attached courses

Timetable -- Language -- Lecturer

[7,310,1.00 Data Analytics I: Predictive Econometrics](#) -- Englisch -- [Mareckova Jana](#)

[7,310,2.00 Data Analytics I: Predictive Econometrics: Exercises](#) -- Englisch -- [Mareckova Jana](#), [Okasa Gabriel](#), [Boller Daniel](#)

[7,310,2.01 Data Analytics I: Predictive Econometrics: Exercises, Group 1](#) -- Englisch -- [Mareckova Jana](#), [Okasa Gabriel](#), [Boller Daniel](#)

#### Course information

#### Course prerequisites

Econometrics at bachelor level, basic knowledge of statistics. Experience with the statistical software R.

#### Learning objectives

- The students will gain a solid background knowledge about different tools and techniques for building statistical and machine learning models to make predictions.
- The students will be able to select an appropriate prediction method.
- The students will be able to assess the quality of prediction studies.
- The students will be able to conduct small prediction studies on their own.

#### Course content

This course explains the difference between causal and predictive modeling and introduces some of the widely used predictive modeling methods and their core principles. The lectures start with the basic concepts in causal and predictive modeling to underline different goals in each approach. The statistical theory is based on a linear regression model which is broadly used in the applied research. The theoretical results further deepen the understanding of what the differences between causal and predictive modeling are. During the rest of the course, several predictive methods are discussed. Additionally, strategies how to obtain the best predictive model including resampling methods such as cross-validation are overviewed.

Furthermore, in 5 PC sessions the students apply the methods discussed in the lectures to data in order to sharpen their intuition and get an idea about the practical relevance of the methods. Students also have to solve problems at home and write an empirical term paper.

#### Course outline:

1. Basic Econometrics Concepts
2. Properties of Linear Estimators and Predictions
3. Prediction vs. Causal Inference (Linear Regression)
4. Supervised Machine Learning Methods



## Course objectives:

- The course familiarizes students with basic econometric and statistical methods.
- The course prepares students to analyse real world empirical prediction problems (conceptual and applied).
- Students work with data and R software packages.

## Course structure

7 lectures, 5 PC sessions and solving econometric problems and projects in groups and at the individual level.

The PC sessions will be taught online due to COVID-19.

## Course literature

Wooldridge (2010): "Econometric Analysis of Cross Section and Panel Data".

Hastie, Tibshirani, Friedman (2009): "The Elements of Statistical Learning".

Hansen (2020): "Econometrics" (online lecture notes).

## Additional course information

The lectures are conducted in face-to-face teaching. The exercises will be taught online.

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 recordings of the course are available for 30 days.
- The lecturer informs via StudyNet on the changed implementation modalities of the course.

The examination information listed below would be changed as follows:

- No changes are necessary.
- Minor changes in topics, deadline, scope, examination modality, allowed examination aids and further information are communicated via StudyNet.

## Examination information

### Examination sub part/s

#### 1. Examination sub part (1/3)

##### Examination time and form

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

Examination time: inter-term break

##### Remark

--

##### 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

-

## Examination languages

Question language: English

Answer language: English

---

## 2. Examination sub part (2/3)

### Examination time and form

Decentral - examination paper written at home (individual) (25%)

Examination time: term time

### Remark

--

### 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 HSC, 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

-

## Examination languages

Question language: English

Answer language: English

---

## 3. Examination sub part (3/3)

### Examination time and form

Decentral - Group examination paper (all given the same grades) (15%)

Examination time: term time

### Remark

--

### 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

-

## Examination languages

Question language: English

Answer language: English

---

## Examination content

All material that is covered in the lectures and PC sessions.

## Examination relevant literature

Wooldridge (2010): "Econometric Analysis of Cross Section and Panel Data".

Hastie, Tibshirani, Friedman (2009): "The Elements of Statistical Learning".

Hansen (2020): "Econometrics" (online lecture notes).

Relevant are only the chapters covered during the lectures and PC sessions.



### 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).