University of St.Gallen

Course and Examination Fact Sheet: Autumn Semester 2021

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 - examination paper written at home (in groups - 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 -- Brox Enzo , Mareckova Jana , Heiniger Sandro

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 especially from the realm of machine learning are discussed. Additionally, strategies how to obtain the best predictive model including resampling methods such as cross-validation are reviewed.

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).

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- Students work with data and R software packages.

Course structure and indications of the learning and teaching design

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

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 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).

Diebold (2017): "Forecasting in Economics, Business, Finance and Beyond" (online lecture notes).

Diebold (2009): "Econometric Data Science: A Predictive Modeling Approach" (online book).

Additional course information

In the case of the President's Board having to implement new directives due to the SARS-CoV-2 pandemic in AS2021, 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
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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
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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
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Examination-aid rule
Term papers

Written work must be written without outside help according to the known citation standards, and a declaration of authorship must be attached, which is available as a template on the StudentWeb.

Documentation (quotations, bibliography, etc.) must be carried out universally and consistently according to the requirements of the chosen/specified citation standard such as e.g. APA or MLA.

The legal standard is recommended for legal work (cf. by way of example: FORSTMOSER, P., OGOREK R., SCHINDLER B., Juristisches Arbeiten: Eine Anleitung für Studierende (the latest edition in each case), or according to the recommendations of the Law School).

The reference sources of information (paraphrases, quotations, etc.) that has been taken over literally or in the sense of the original text must be integrated into the text in accordance with the requirements of the citation standard used. Informative and bibliographical notes must be included as footnotes (recommendations and standards e.g. in METZGER, C., Lern- und Arbeitsstrategien (latest edition)).

For all written work at the University of St.Gallen, the indication of page numbers is mandatory, regardless of the standard chosen. Where page numbers are missing in sources, the precise designation must be made differently: chapter or section title, section number, article, etc.

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

3. Examination sub part (3/3)

Examination time and form
Decentral - examination paper written at home (in groups - all given the same grades) (15%)
Examination time: term time

Remark
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Examination-aid rule
Term papers

Written work must be written without outside help according to the known citation standards, and a declaration of authorship must be attached, which is available as a template on the StudentWeb.

Documentation (quotations, bibliography, etc.) must be carried out universally and consistently according to the requirements of the chosen/specified citation standard such as e.g. APA or MLA.

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Supplementary aids
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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".

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

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

Diebold (2017): "Forecasting in Economics, Business, Finance and Beyond" (online lecture notes).

Diebold (2009): "Econometric Data Science: A Predictive Modeling Approach" (online book).

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

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Please note

Please note that only this fact sheet and the examination schedule published at the time of bidding are is 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, 26 August 2021);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 18 October 2021);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 18 October 2021);

Examination information (regulations on aids, examination contents, examination literature) for centrally organised examinations: two weeks before the end of the registration period in CW 45 (Monday, 8 November 2021).