



Course and Examination Fact Sheet: Autumn Semester 2021

9,332: Advanced Econometric Methods

ECTS credits: 4

Overview examination/s

(binding regulations see below)

Decentral - Oral examination (individual) (50%)

Examination time: term time

Decentral - examination paper written at home (in groups - all given the same grades) (50%)

Examination time: term time

Attached courses

Timetable -- Language -- Lecturer

[9.332.1.00 Advanced Econometric Methods](#) -- Englisch -- [Bonev Petyo](#)

Course information

Course prerequisites

The course is designed for those with sufficient knowledge in econometrics and with interest in theoretical results. Econometrics on bachelor level is a must. The lectures "Data analytics I: predictive econometrics", "Data analytics II: causal econometrics" and "Microeconometrics" are not a must but would be highly helpful.

Learning objectives

The objective of the course is to help participants develop a thorough understanding of the most important econometric estimation techniques. One focus of the course will be on state-of-art Machine Learning methods such as LASSO, RIDGE and Random Forests, which play growing role in modern empirical studies. The difference to other econometrics courses is that the main emphasis will be to develop intuition for the theoretical side of those concepts.

Course content

The content will cover the following topics: M estimation (nonlinear models), nonparametric and semi-parametric regression techniques, Machine Learning regression techniques (LASSO, Ridge, Random Forests), Machine Learning binary classification methods, Bootstrap.

Course structure and indications of the learning and teaching design

There will be a weekly lecture. Every third week, there will be an exercise session, for which students have to prepare solutions to problem sets.

Course literature

There will be a lecture script.

Additional Sources:

- 1) The excellent book by Hastie et al. "The elements of statistical learning" (2nd edition)
- 2) The evergreen classic book "Nonparametric econometrics" by Pagan and Ullah (1999)
- 3) The wonderful book by Li and Racine (2007): "Nonparametric econometrics, theory and practice"
- 4) Chapter 36 of the Handbook of Econometrics by Newey and McFadden (1994) "Large sample estimation and hypothesis testing"

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 180 days;
- The lecturer informs via Canvas on the changed implementation modalities of the course;

The examination information listed below would be changed as follows:

- The oral examinations are conducted online and are being recorded.

Examination information

Examination sub part/s

1. Examination sub part (1/2)

Examination time and form

Decentral - Oral examination (individual) (50%)

Examination time: term time

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

A pen and a sheet of paper.

Examination languages

Question language: English

Answer language: English

2. Examination sub part (2/2)

Examination time and form

Decentral - examination paper written at home (in groups - all given the same grades) (50%)

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

Open book

Examination languages

Question language: English

Answer language: English

Examination content

Topic 1: M-estimation. Nonlinear estimation, Maximum Likelihood estimation.

Topic 2: Nonparametric and semiparametric estimation. Density kernel estimation, nonparametric and semiparametric estimation of conditional mean.

Topic 3: Machine Learning regression methods. Basic principles (out-of-sample cross validation, regularization, scalability). Supervised learning: LASSO, Ridge.

Topic 4: Regression trees. Intuition, practice and theoretical aspects (e.g. selecting the penalty, pruning the tree, etc.). Random forests.

Topic 5: Bootstrap

Examination relevant literature

Only the lecture script and the exercises are relevant for the exam.

The script will be made available on Canvas at the beginning of the semester.



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, 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).