



Course and Examination Fact Sheet: Autumn Semester 2022

10,368: Causal Machine Learning (GSERM)

ECTS credits: 4

Overview examination/s

(binding regulations see below)

Decentral - Written examination (with defined exam duration) (40%)

Examination time: term time

Decentral - Active participation (20%)

Examination time: term time

Decentral - Presentation (in groups - all given the same grades) (20%)

Examination time: term time

Decentral - Presentation (individual) (20%)

Examination time: term time

Attached courses

Timetable -- Language -- Lecturer

[10,368,1.00 Causal Machine Learning \(GSERM\)](#) -- Englisch -- [Lechner Michael](#)

Course information

Course prerequisites

As defined for the econometrics specialisation of PEF and PEcon.

Learning objectives

Students will learn the modern concepts of identification and estimation of causal effects and their application to real data. There will be a particular emphasis on how machine learning methods can be integrated into the estimation procedures.

Course content

In the past 60 years econometrics provided us with many tools to uncover lots of different types of correlations. The technical level of this literature is impressive. However, correlations are less interesting if they do not have a causal implication. For example, the fact that smokers are more likely to die earlier than other people does not tell us much about the effect of smoking. It might just be that smokers are the type of people who face more health and crime risks for quite different (social or genetic) reasons. The same problem occurs with almost any correlation of economic or financial variables. The interesting question is always whether these correlations are *spurious*, or whether they do tell us something about the underlying *causal* link of the different variables involved?

In this course we review and organize the rapidly developing literature on causal analysis in economics and econometrics and consider the conditions and methods required for drawing causal inferences from the data. Empirical applications are important in this course and so is the very recent literature on causal machine learning.

Active participation of PhD students participating in this course is expected. During the second part of the course, participants will conduct their own empirical study and present their results.

Course structure and indications of the learning and teaching design

General structure and rules



Students activities

Active participation of the students in this course is the key to its success. Students are expected to do the following:

- 1) Read the papers shown as 'compulsary reading' in the reading list BEFORE the lecture concerned with the topic.
- 2) Each morning students will present a paper (10-30 minutes each; depending on the number of participants) and there will be some general discussion about these papers. Students not presenting will be expected at least to sketch the papers to be able to participate in the discussion.
- 3) Small groups of students (group size depends on number of participants) will conduct an independent empirical study (using Software of their own choice; GAUSS, R or Python is recommended). In the empirical project students will show that they understood the basic concepts and are able to apply them to a 'real life' situation.

Grading

Written Exam about 4 weeks after the last lecture (2 hours) (40%).

Students' active participation in general discussions during lectures and presentations (20%).

Presentation of papers (20%).

Empirical project (based on two presentations; 20%).

Exchange students

... are welcome if they fulfill the prerequisites. Same rules apply as for PEF and PEcon students. If it can be organised in a way that deems to be appropriate by the lecturer, exchange students may do the written exam outside of St. Gallen.

Course literature

To be published shortly before the lecture.

Additional course information

PhD students of the University of St.Gallen

PEF, PiF and PEcon students may register via regular bidding for the courses offered together by PEcon and Global School in Empirical Research Methods (GSERM). Enrolment in a course is binding: students have to attend the course and take the exam. The credits will be shown on the scorecard.

All other PhD students should register for the courses offered by Global School in Empirical Research Methods (GSERM), **both via bidding and via GSERM** for:

-courses for the curriculum and

-optional courses **with** an examination. These will be listed on the scorecard under optional work (**only possible if all required elective courses have already been completed**).

Please register **only via GSERM** for:

-optional courses **without** an examination and

-optional courses **if not all required elective courses have been completed** (not shown on the scorecard)

Examination information

Examination sub part/s



1. Examination sub part (1/4)

Examination time and form

Decentral - Written examination (with defined exam duration) (40%)

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

No additional aids.

Examination languages

Question language: English

Answer language: English

2. Examination sub part (2/4)

Examination time and form

Decentral - Active participation (20%)

Examination time: term time

Remark

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Examination-aid rule

Active classroom participation

In the "Active classroom participation" examination form, regular participation in class is assessed.

The assessment criteria can be as follows:

- Requests to speak enrich the discussion (productive) / requests to speak disturb the discussion (counterproductive);
- Requests to speak are correct/requests to speak are incorrect;
- Requests to speak are frequent/average/rare;
- No requests to speak, but students follow the lesson/no requests to speak and students do not noticeably follow the lessons.

Supplementary aids

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Examination languages

Question language: English

Answer language: English



3. Examination sub part (3/4)

Examination time and form

Decentral - Presentation (in groups - all given the same grades) (20%)

Examination time: term time

Remark

If needed, this will be online.

Examination-aid rule

Practical examination

No examination-aid rule is necessary for such examination types. The rules and regulations of the University of St. Gallen apply in a subsidiary fashion.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

4. Examination sub part (4/4)

Examination time and form

Decentral - Presentation (individual) (20%)

Examination time: term time

Remark

If needed, this will be online.

Examination-aid rule

Practical examination

No examination-aid rule is necessary for such examination types. The rules and regulations of the University of St. Gallen apply in a subsidiary fashion.

Supplementary aids

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Examination languages

Question language: English

Answer language: English

Examination content

Empirical work, literature, contents of lecture. If required by the current crisis, there will be online options available.

Examination relevant literature

To be defined during the lecture



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, 25 August 2022);
- Examination information (regulations on aids, examination contents, examination literature) for decentralised examinations: in CW 42 (Monday, 17 October 2022);
- Examination information (regulations on aids, examination contents, examination literature) for centrally organised mid-term examinations: in CW 42 (Monday, 17 October 2022);
- 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, 7 November 2022).